



# **Armed Forces College of Medicine AFCM**



# ***Shoulder Girdle and Joint***

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***Lecturer of Anatomy***

# ***INTENDED LEARNING OBJECTIVES (ILO)***



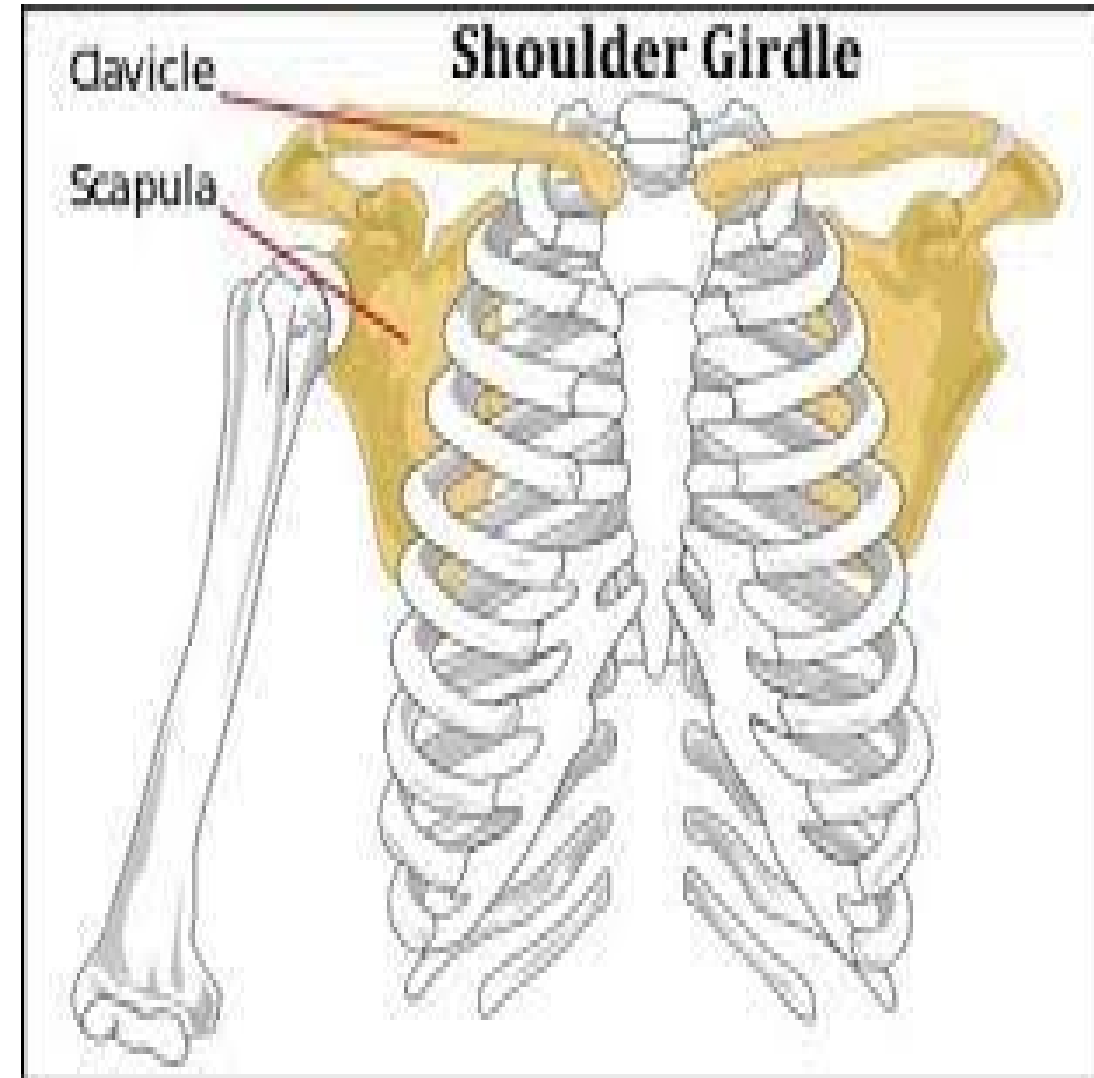
**By the end of this lecture the student will be able to:**

- 1. Describe the structure of the shoulder girdle.**
- 2. Describe the structure of the Sternoclavicular, acromioclavicular and Shoulder Joints.**
- 3. Describe the type, articular surfaces, fibrous capsule, synovial membrane, Ligaments, relations of these joints.**
- 4. Describe the arterial blood supply and nerve supply of these joints.**
- 5. Describe the movements of these joints and name the muscles performing these movements.**

# ***The Shoulder Girdle***



- It is the bony element that connects the upper limb to the axial skeleton.
- It is formed of the clavicle (anteriorly) & the scapula (posteriorly) surrounding the upper part of the side of the chest.
- The 2 bones articulate at the acromioclavicular joint.



# ***The Shoulder Girdle***

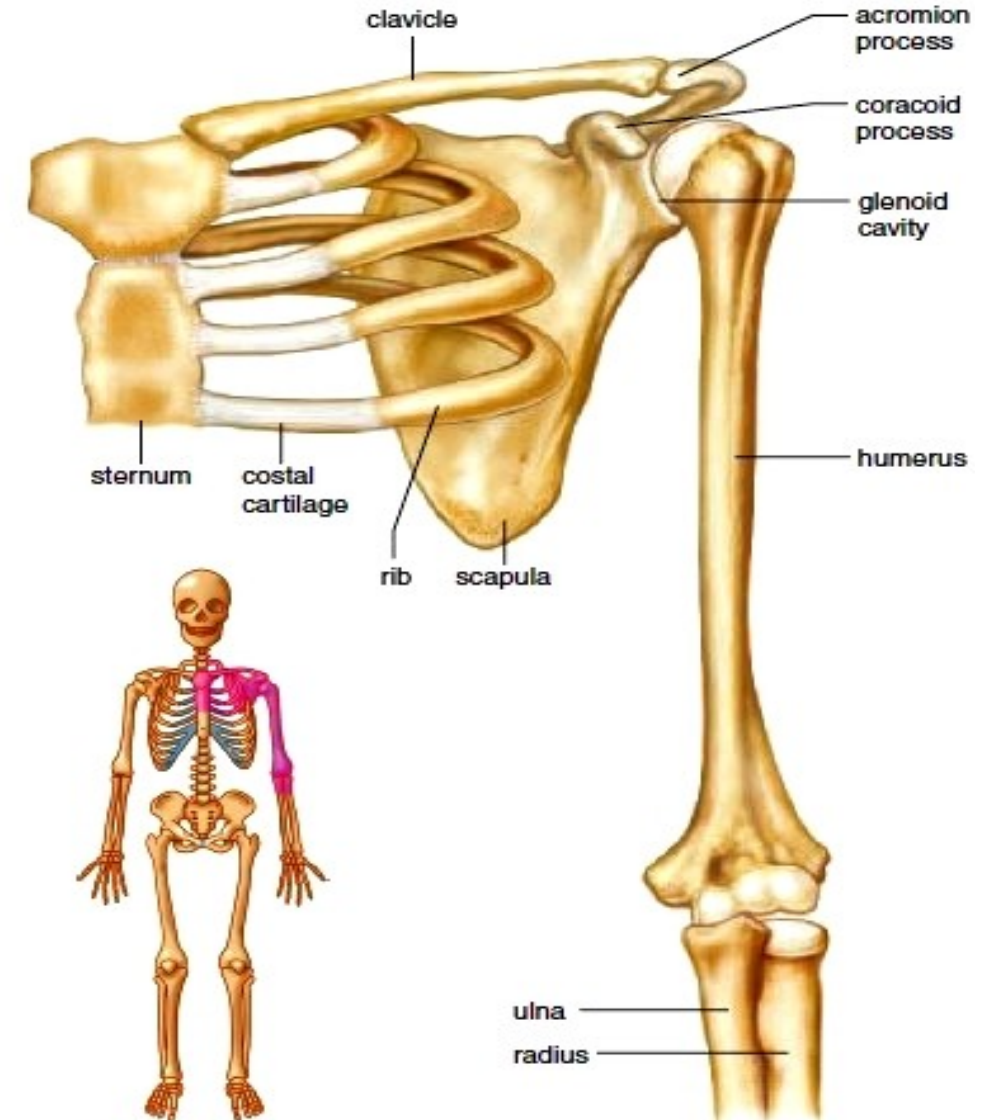


**The shoulder girdle is connected to the axial skeleton via:**

- 1. Sternoclavicular joint (anteriorly).**
- 2. Muscles of the back (posteriorly).**

## **Function:**

**It suspends the upper limb from the axial skeleton to increase its range of movement.**

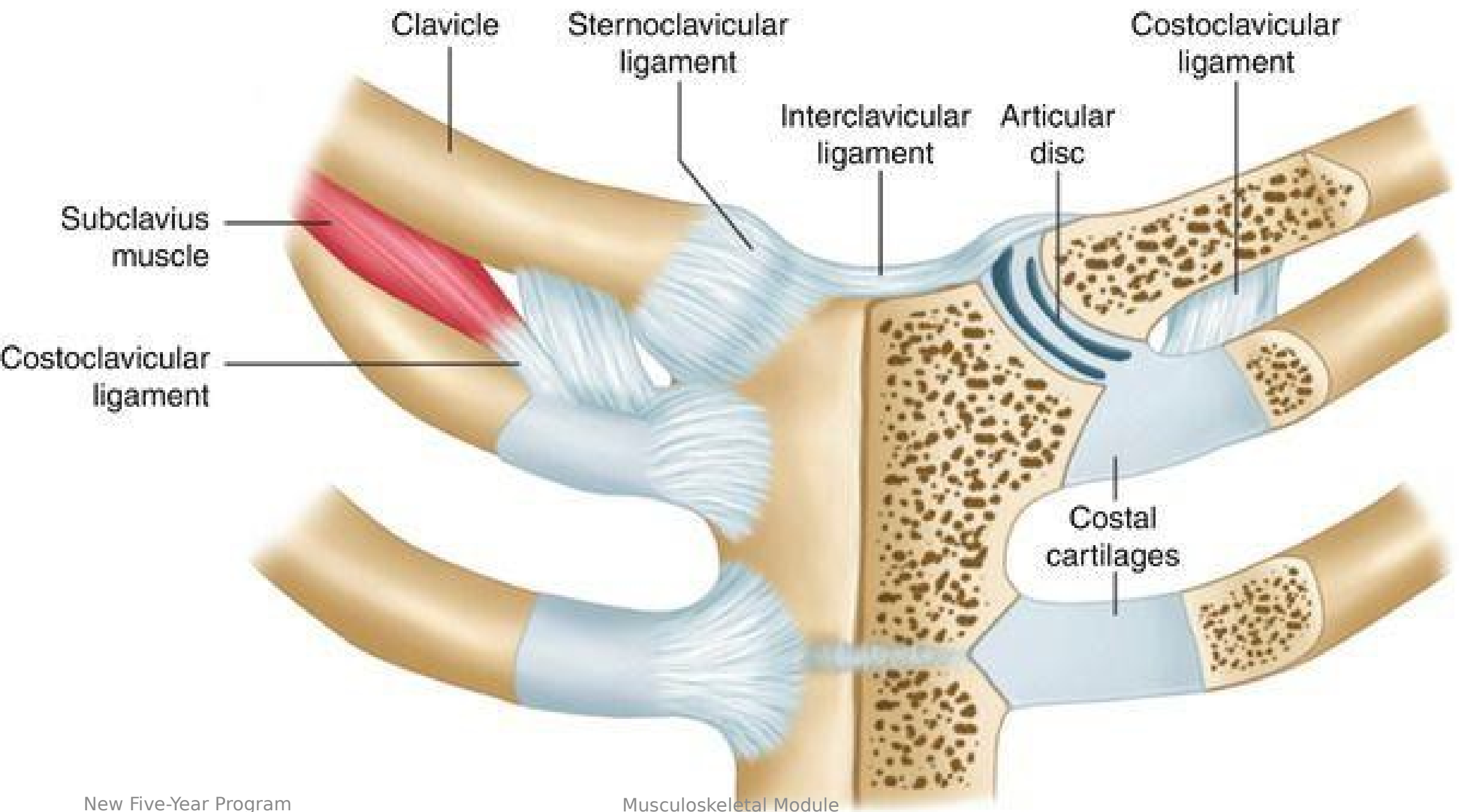


a. Pectoral girdle, frontal view

# ***Sternoclavicular Joint***



- ***It suspends the upper limb from the axial skeleton to increase its range of movement.***
- Consists of the ***sternal end*** of the ***clavicle***, the ***manubrium*** of the ***sternum***, and part of the 1<sup>st</sup> costal cartilage.
- The articular surfaces are covered with ***fibrocartilage*** (as opposed to hyaline cartilage, present in most synovial joints). The joint is separated ***into two compartments by a fibrocartilaginous articular disc.***

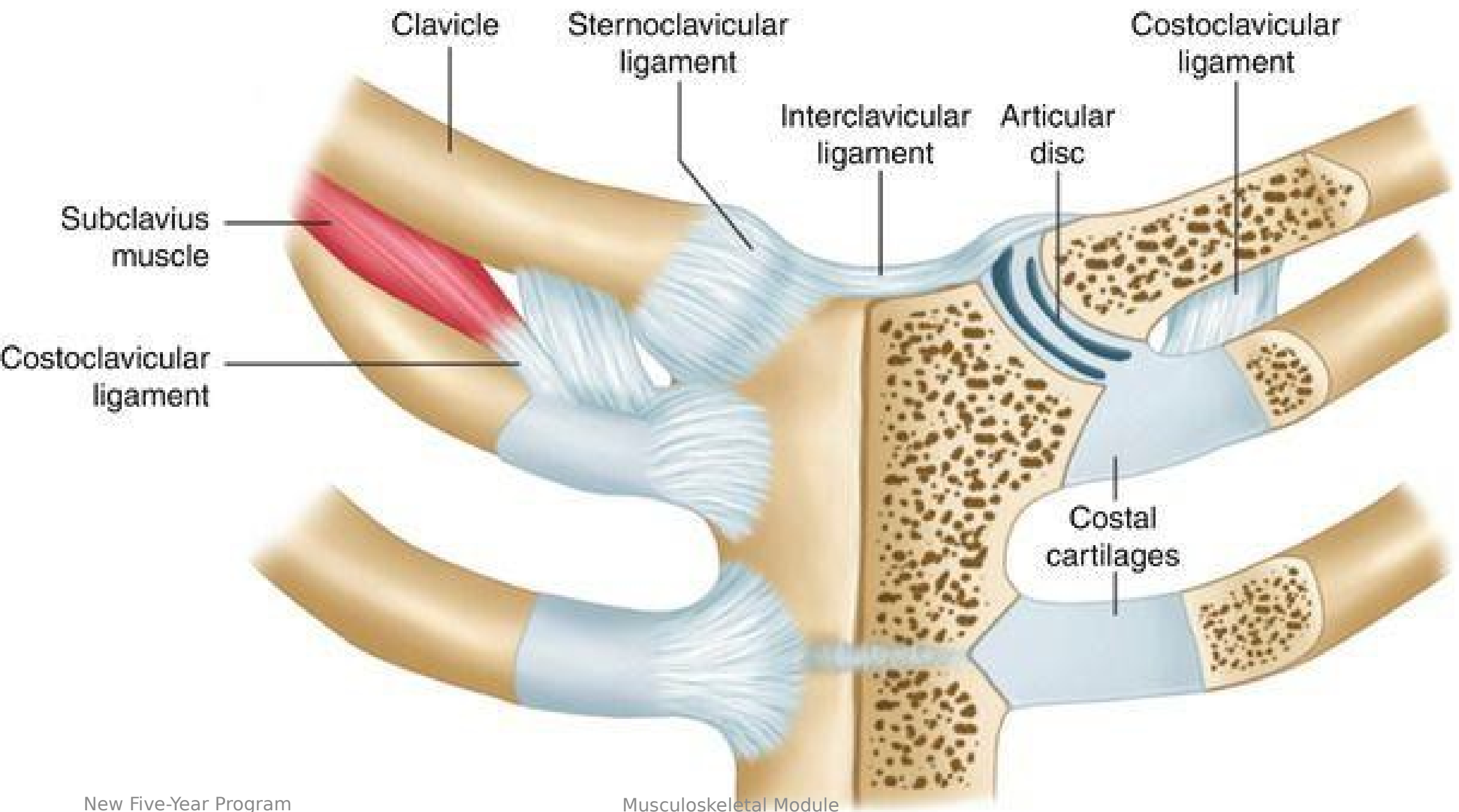


# ***Sternoclavicular Joint***



- ***Type:*** Modified saddle synovial joint.
- ***Fibrous capsule:*** It is attached to the margins of the articular surfaces and is thickened anteriorly and posteriorly.
- ***Synovial membrane:*** It lines the capsule & is divided into 2 separate cavities (medial and lateral) by an articular disc.







**Clavicle**

**Articular  
disk**

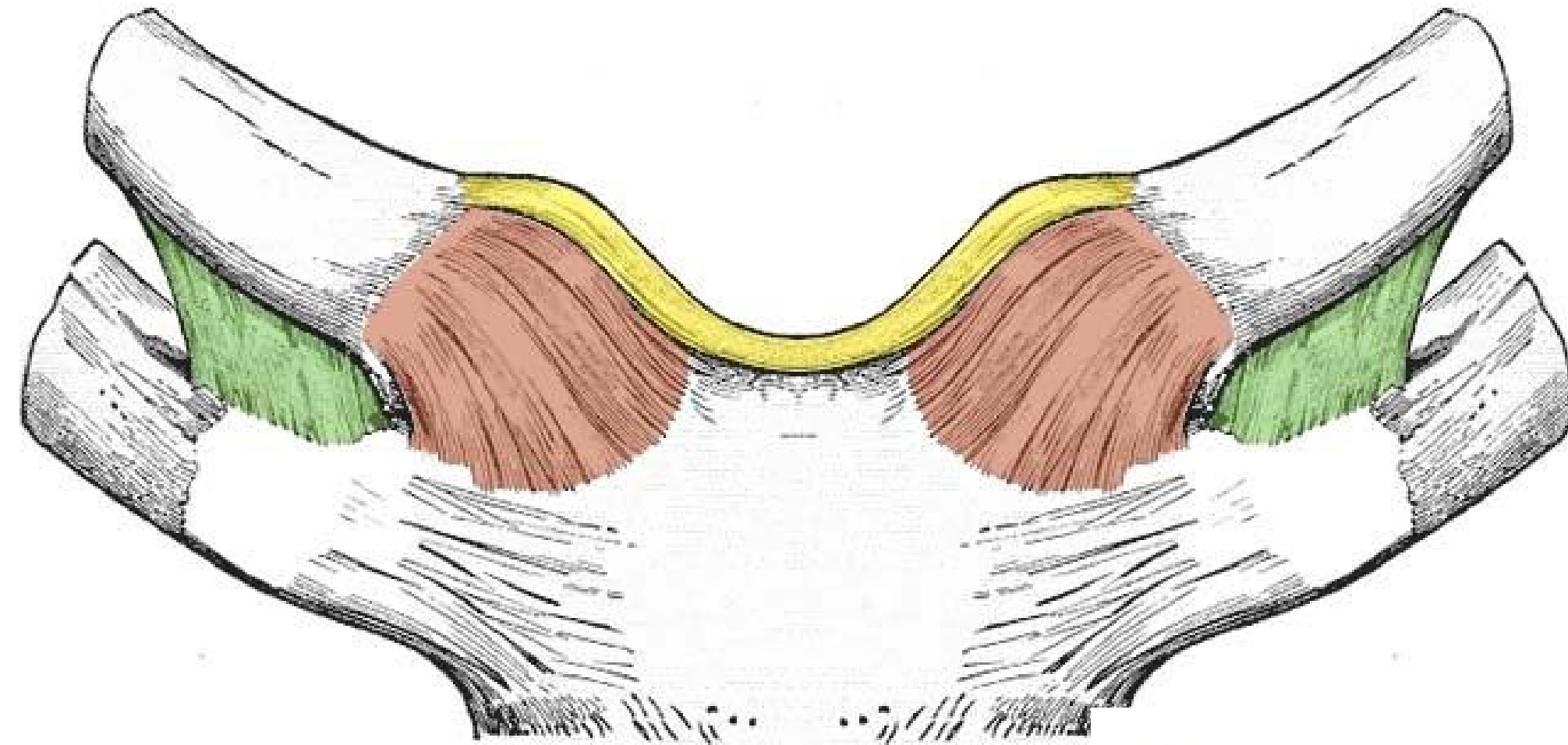
**Rib 1**




**Manubrium**

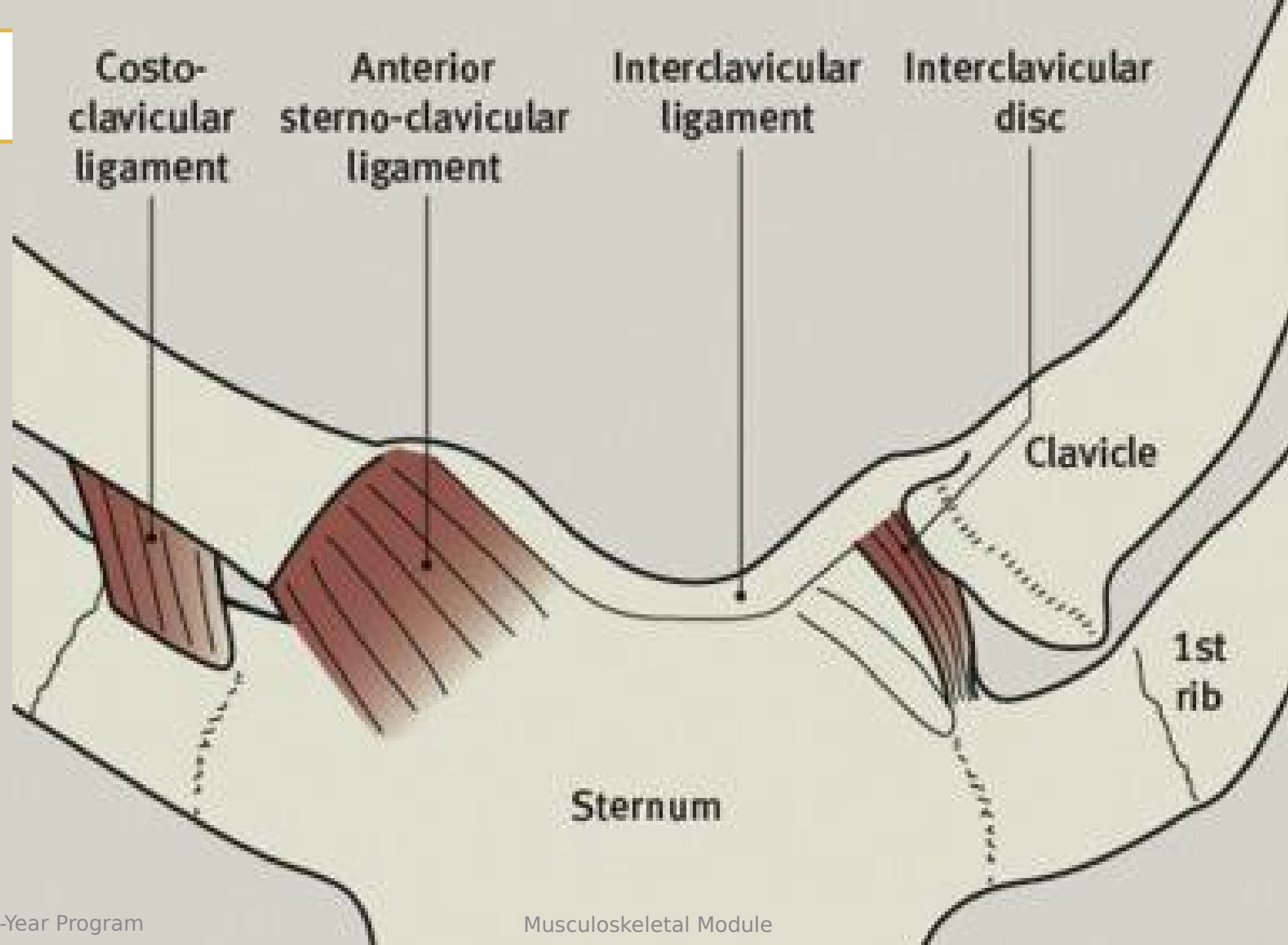
# Ligaments



- The ligaments of the sternoclavicular joint provide much of its stability. There are four major ligaments:
- **Sternoclavicular ligaments** (anterior and posterior) - these strengthen the joint capsule
- **Interclavicular ligament:** this spans the gap between the sternal ends of each clavicle and reinforces the joint capsule **superiorly**.



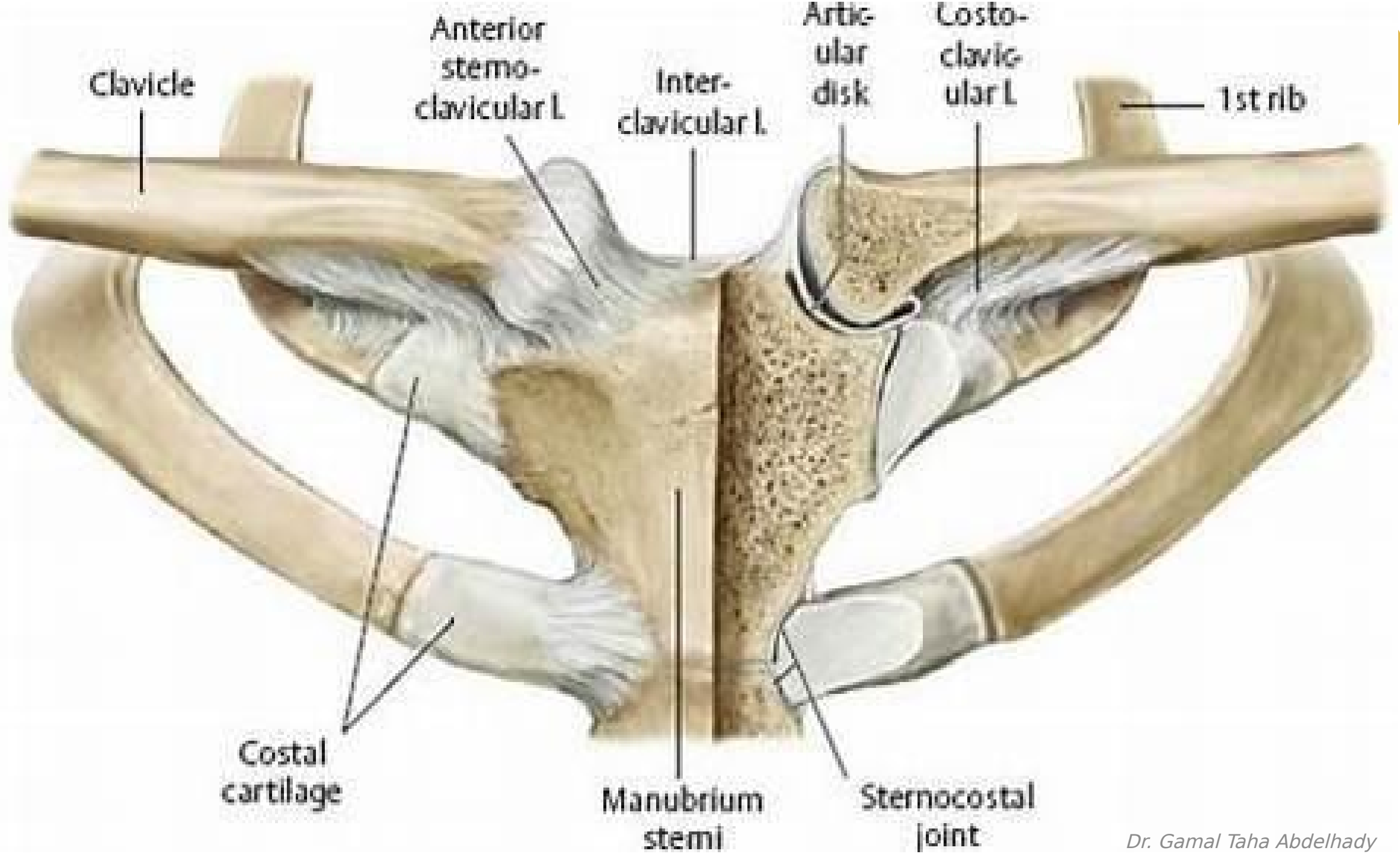
-  **Interclavicular lig.**
-  **Anterior sternoclavicular lig.**
-  **Costoclavicular lig.**



# Ligaments



- ***Costoclavicular ligament:*** the two parts of this ligament (often separated by a bursa) bind at the **1<sup>st</sup> rib and cartilage** inferiorly and to the anterior and posterior borders of the **clavicle** superiorly.
- It is a **very strong ligament** and is the **main stabilizing force** for the joint, resisting elevation of the pectoral girdle.
- ***The sternoclavicular and interclavicular ligaments can be considered to be thickenings of the joint capsule.***



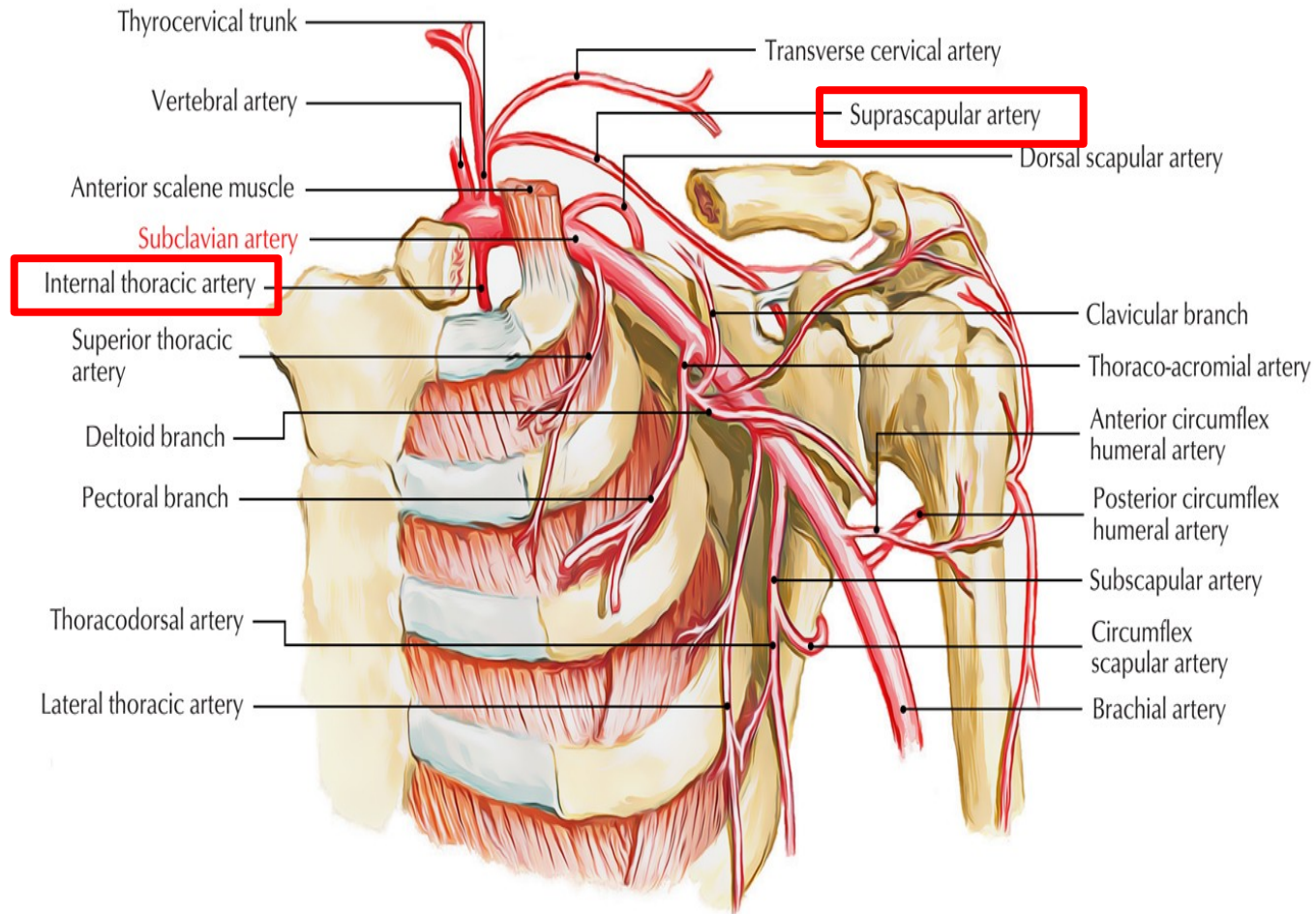
# ***Blood and Nerve Supply***



- ***The arterial supply to the joint is via two vessels:***
  - ***Internal thoracic artery.***
  - ***Suprascapular artery.***
- ***Nerves:***
  - ***Medial supraclavicular nerve***
  - ***Nerve to subclavius.***



# Blood Supply



# ***Acromioclavicular Joint***

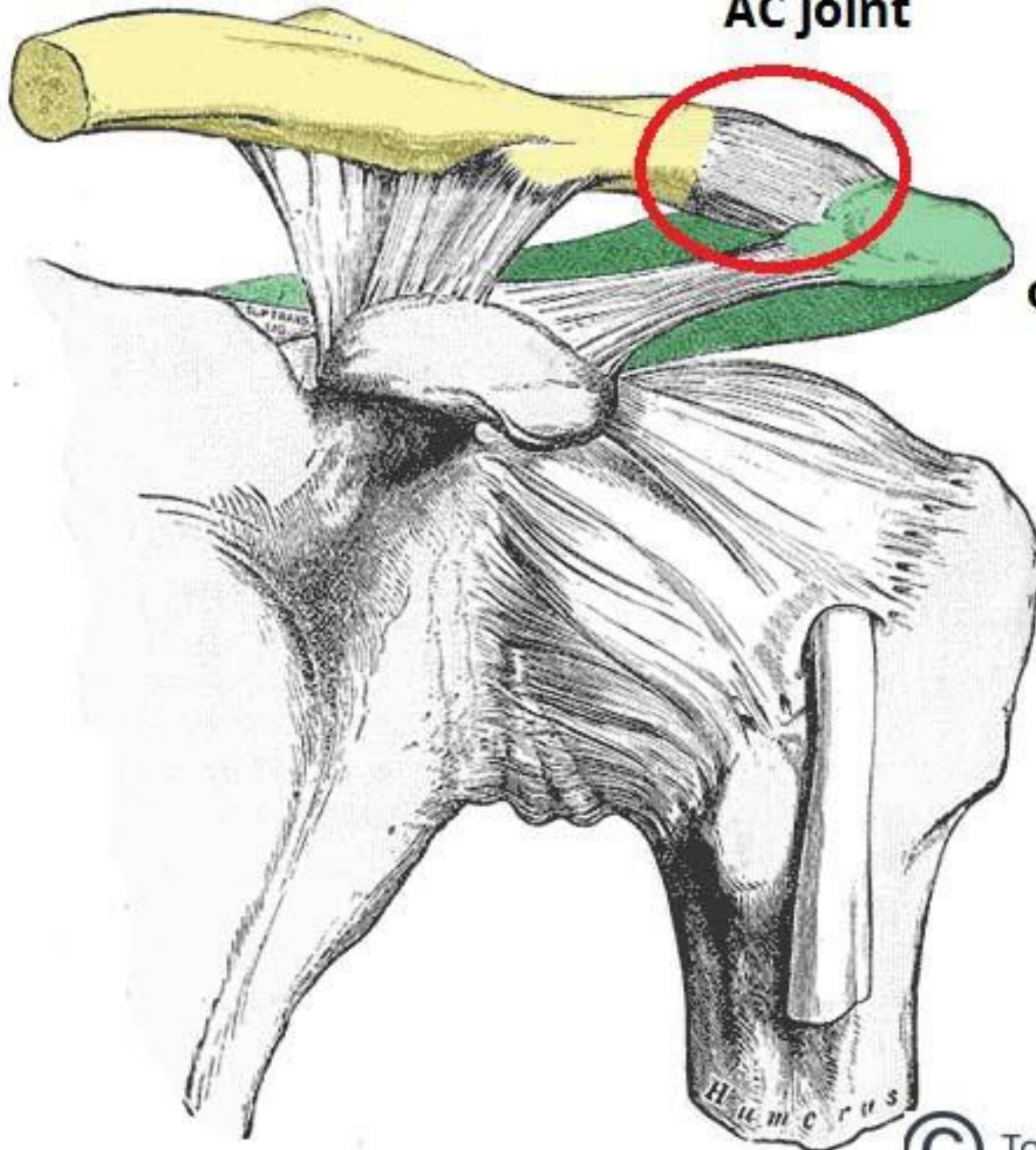


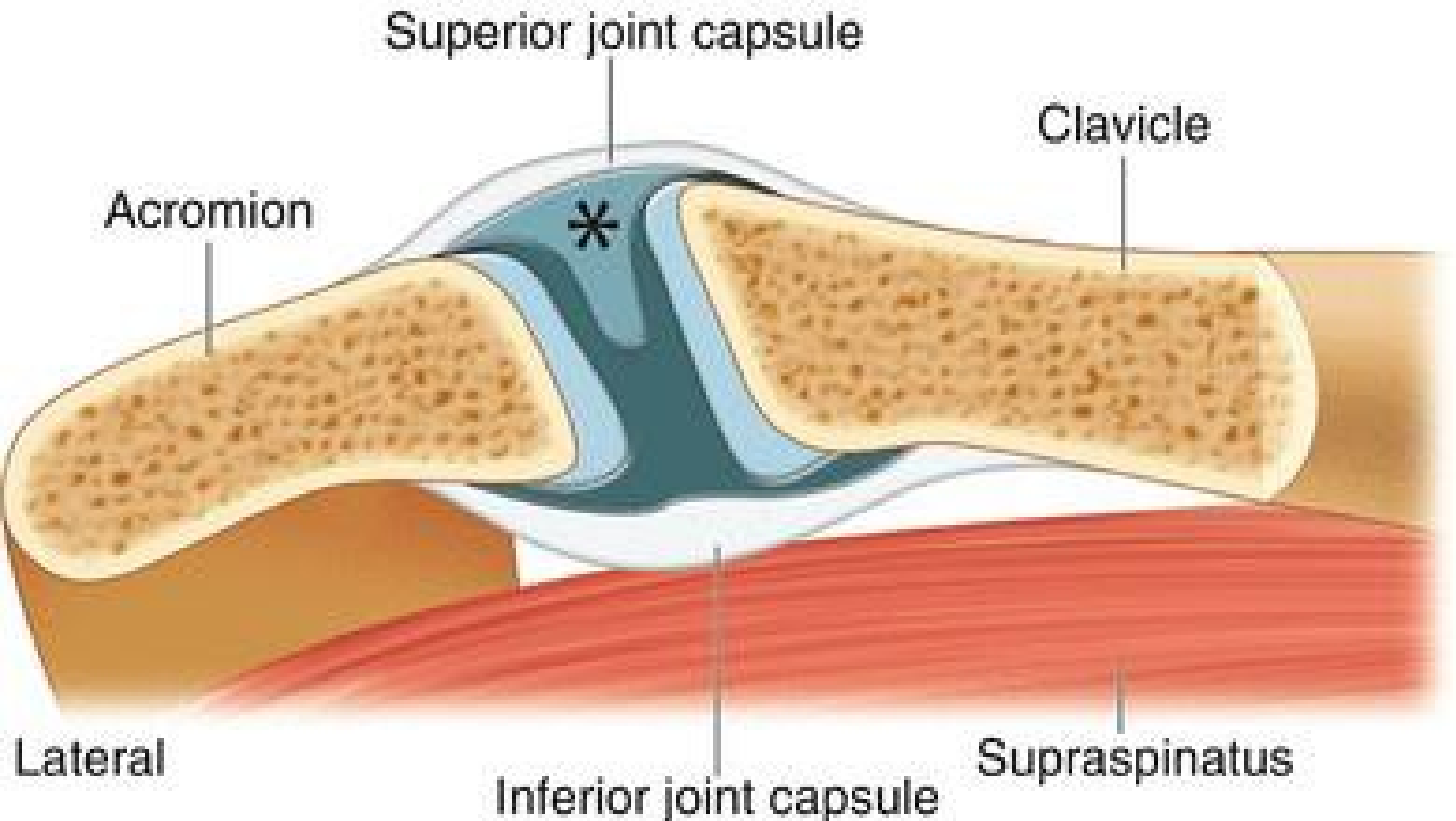
- ***Plan Synovial Joint***
- The acromioclavicular joint consists of an articulation between the ***lateral end of the clavicle*** and the ***acromion*** of the scapula. It has a joint cavity that is partially ***divided incompletely*** by an ***articular disc***
- The joint capsule consists of a loose **fibrous** layer which encloses the two articular surfaces.

**Clavicle**

**AC joint**

**Acromion  
of the scapula**

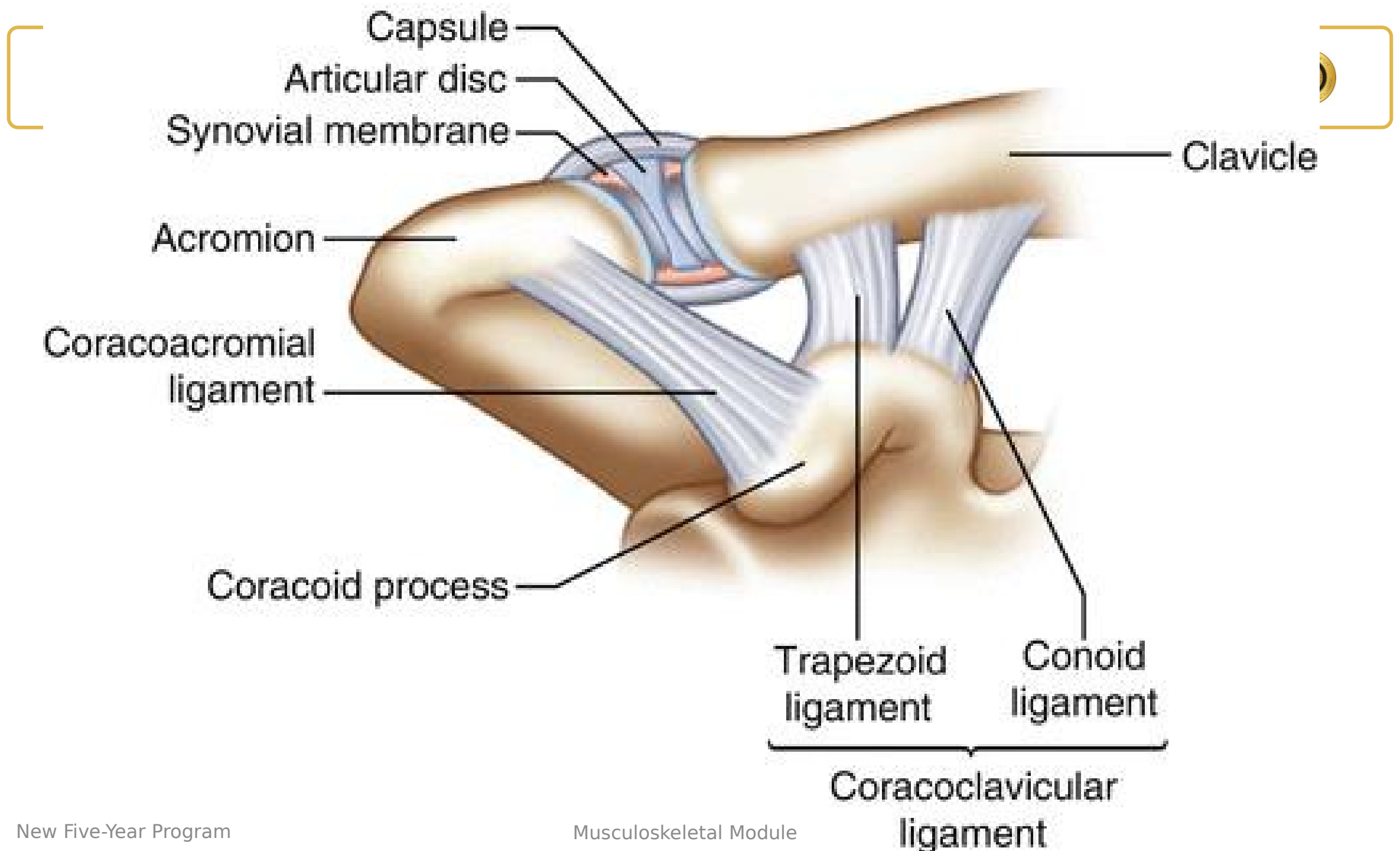




# ***Joint Capsule***



- It also *gives rise to the articular disc.* The posterior aspect of the joint capsule is reinforced by fibers from the trapezius muscle.
- As would be expected of a synovial joint, joint capsule is lined internally by a **synovial membrane**. This secretes synovial fluid into the cavity of the joint.



# ***Ligaments***



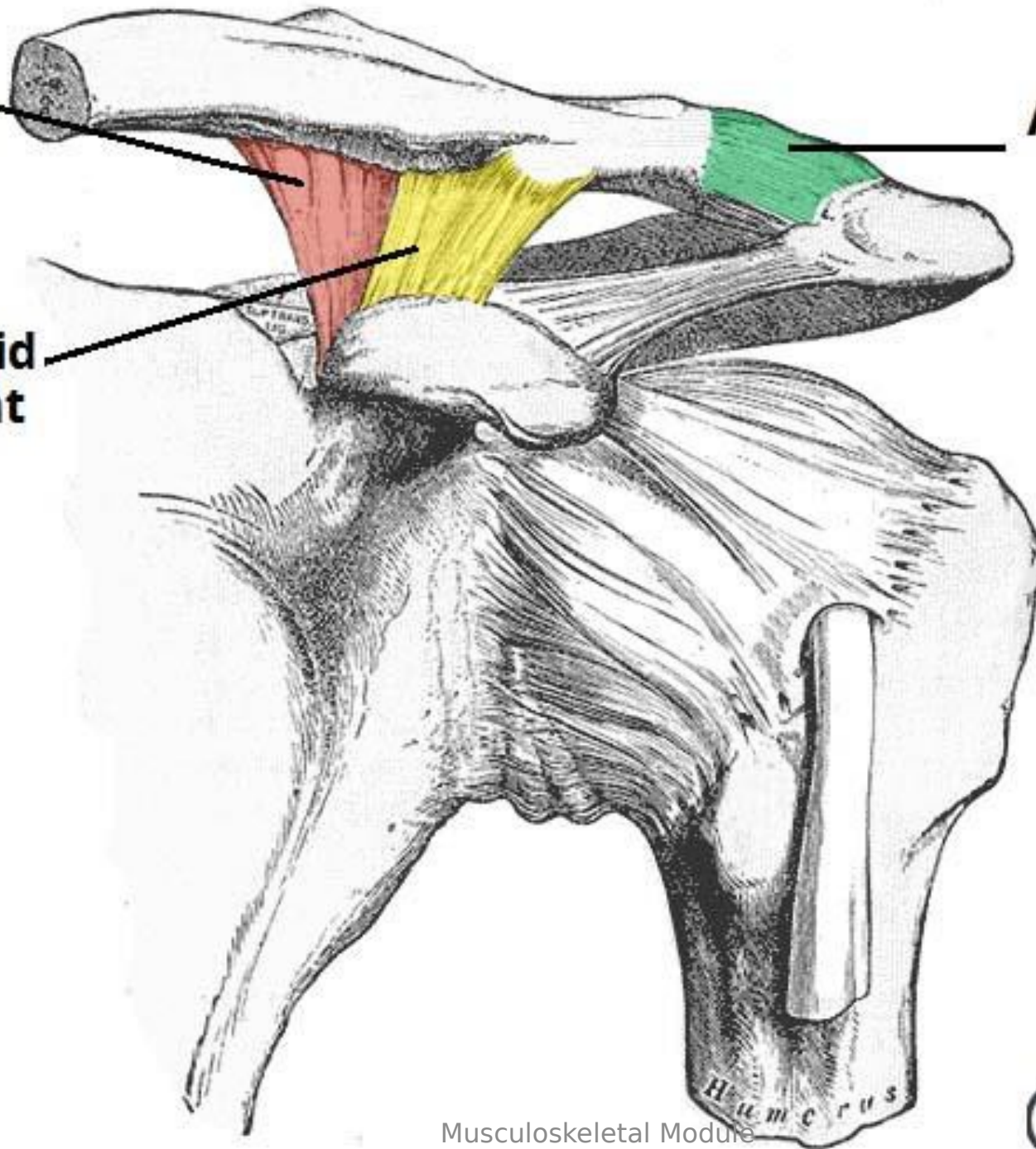
- There are ***three main ligaments*** that strengthen the acromioclavicular joint.
- ***Acromioclavicular ligament:*** runs horizontally from the acromion to the lateral clavicle. It covers the joint capsule, reinforcing its superior aspect.



**Conoid  
ligament**

**Acromioclavicular  
ligament**

**Trapezoid  
ligament**





# ***Ligaments***

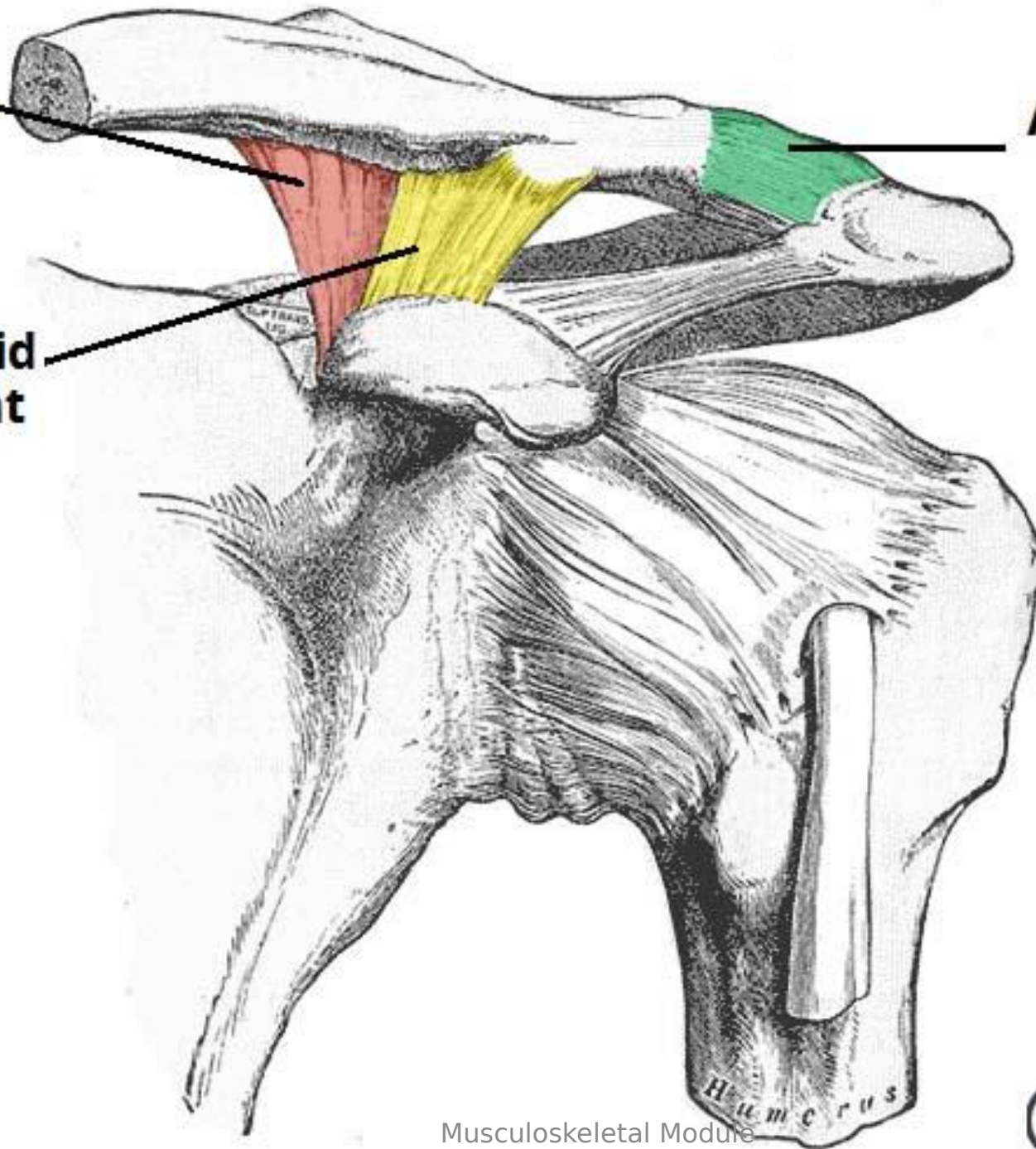


- ***Coracoclavicular Ligament:***
- ***Conoid ligament:*** runs vertically from the coracoid process of the scapula to the conoid tubercle of the clavicle.
- ***Trapezoid ligament:*** runs from the coracoid process of the scapula to the trapezoid line of the clavicle.

**Conoid  
ligament**

**Acromioclavicular  
ligament**

**Trapezoid  
ligament**

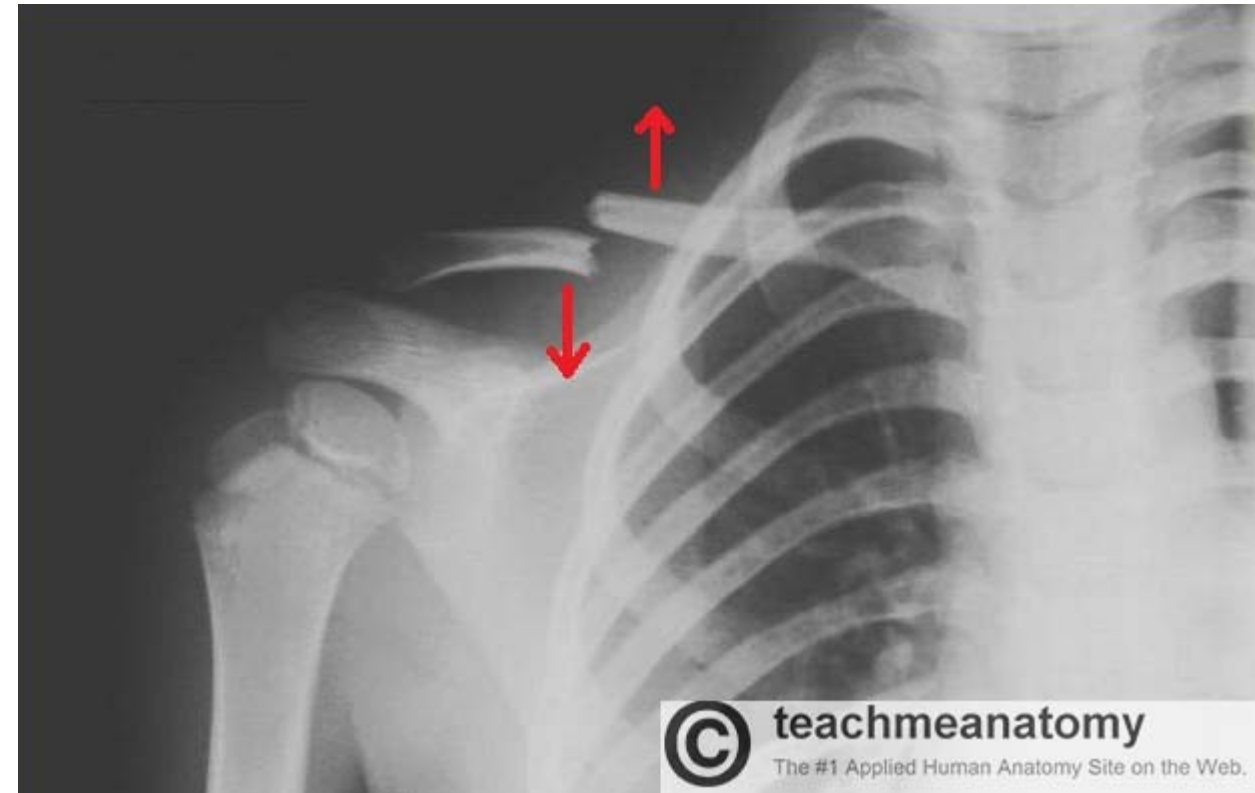
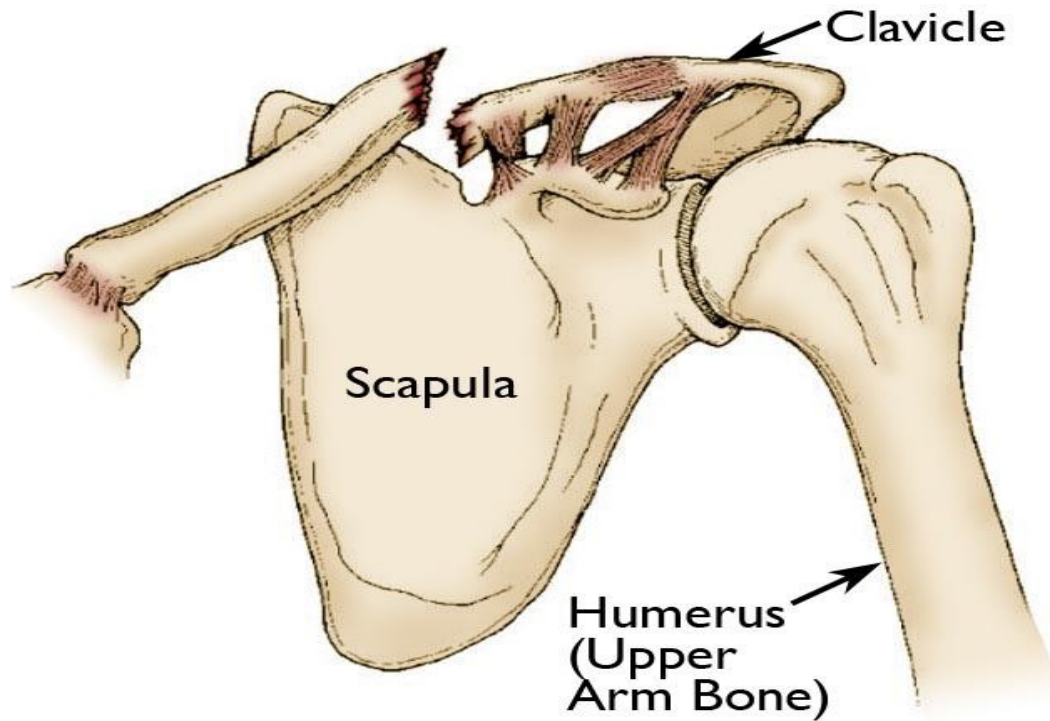


# Ligaments



- Collectively, the **conoid** and **trapezoid** ligaments are **known as** the **coracoclavicular ligament**.
- It is a very strong structure, effectively suspending the weight of the upper limb from the clavicle
- The **fracture** of the clavicle **medial** to the **attachment** of the **coracoclavicular ligament** leads to **drop** of **shoulder**.
- **If the ligament is torn the scapula falls down.**

# ***Fracture Medial Clavicle***

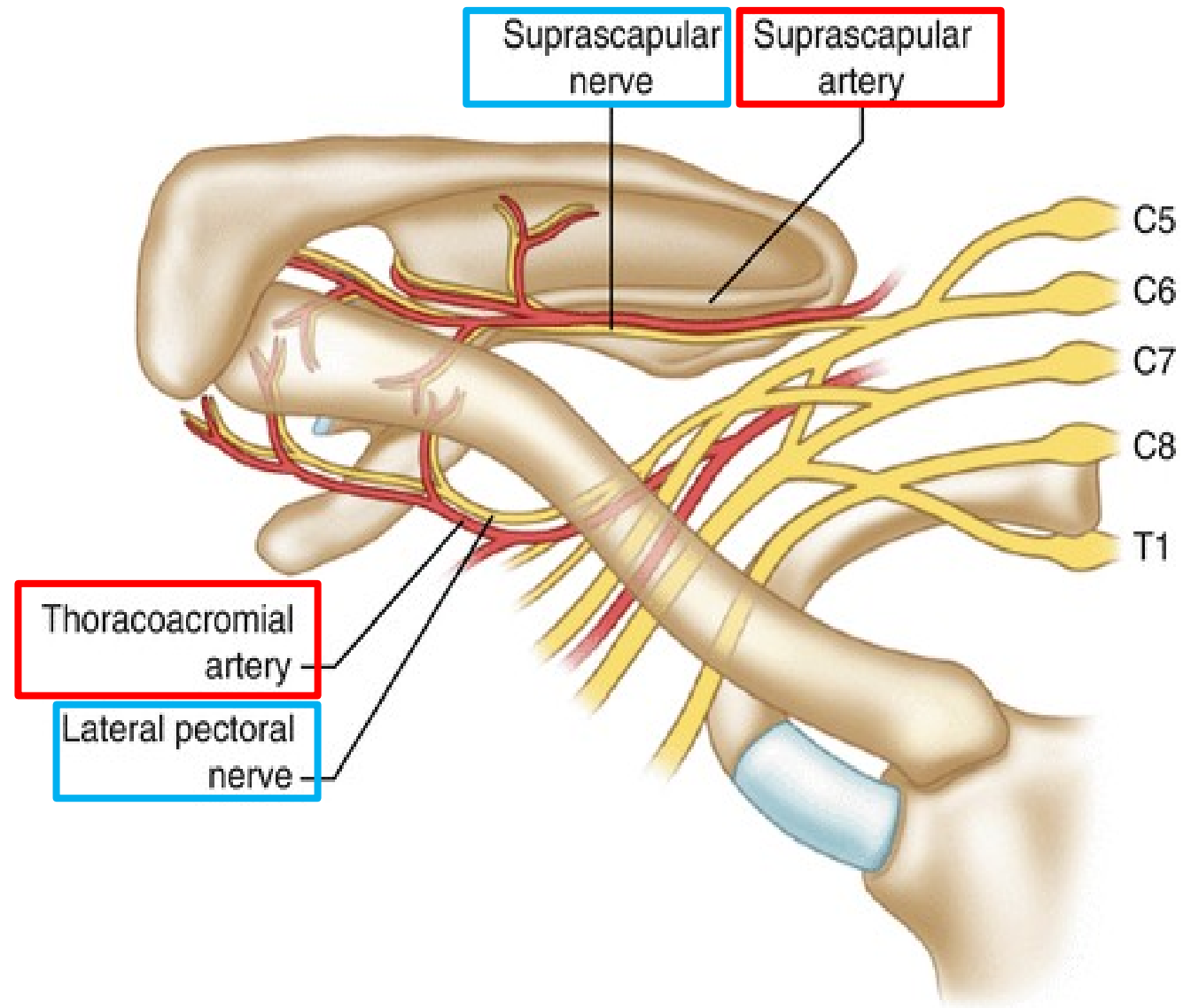


# ***Blood and Nerve Supply***



- ***The arterial supply to the joint is via two vessels:***
- ***Suprascapular artery*** - arises from the subclavian artery at the thyrocervical trunk.
- ***Thoraco-acromial artery***- arises from the axillary artery.
- ***Nerves:***
- The acromioclavicular joint is innervated by articular branches of the ***suprascapular*** and ***lateral pectoral nerves***. They both arise directly from the **brachial plexus**.

# ***Blood Supply***





# ***Shoulder Joint***



# Shoulder Joint



- The shoulder joint is formed by the articulation of the **head** of the **humerus** with the **glenoid cavity** (or fossa) of the scapula. This gives rise to the alternate name for the shoulder joint - the **glenohumeral joint**.
- Like most synovial joints, the articulating surfaces are covered with **hyaline cartilage**. *The **head** of the **humerus** is much **larger** than the **glenoid fossa**, giving the joint a **wide range of movement** at the cost of its instability.*
- To reduce the disproportion in surfaces, the glenoid fossa is deepened by a fibrocartilage rim, called the **glenoid labrum**



# Capsule



- **Medially:** it is attached to the margin of the glenoid cavity outside the labrum glenoidale & above the supraglenoid tubercle.
- **The labrum glenoidale and the tendon of long head of the biceps brachii are intracapsular.**
- **Laterally:** it is attached to the anatomical neck of the humerus. However, it descends for about 34 inch medially to surgical neck of the humerus.



Shoulder joint capsule

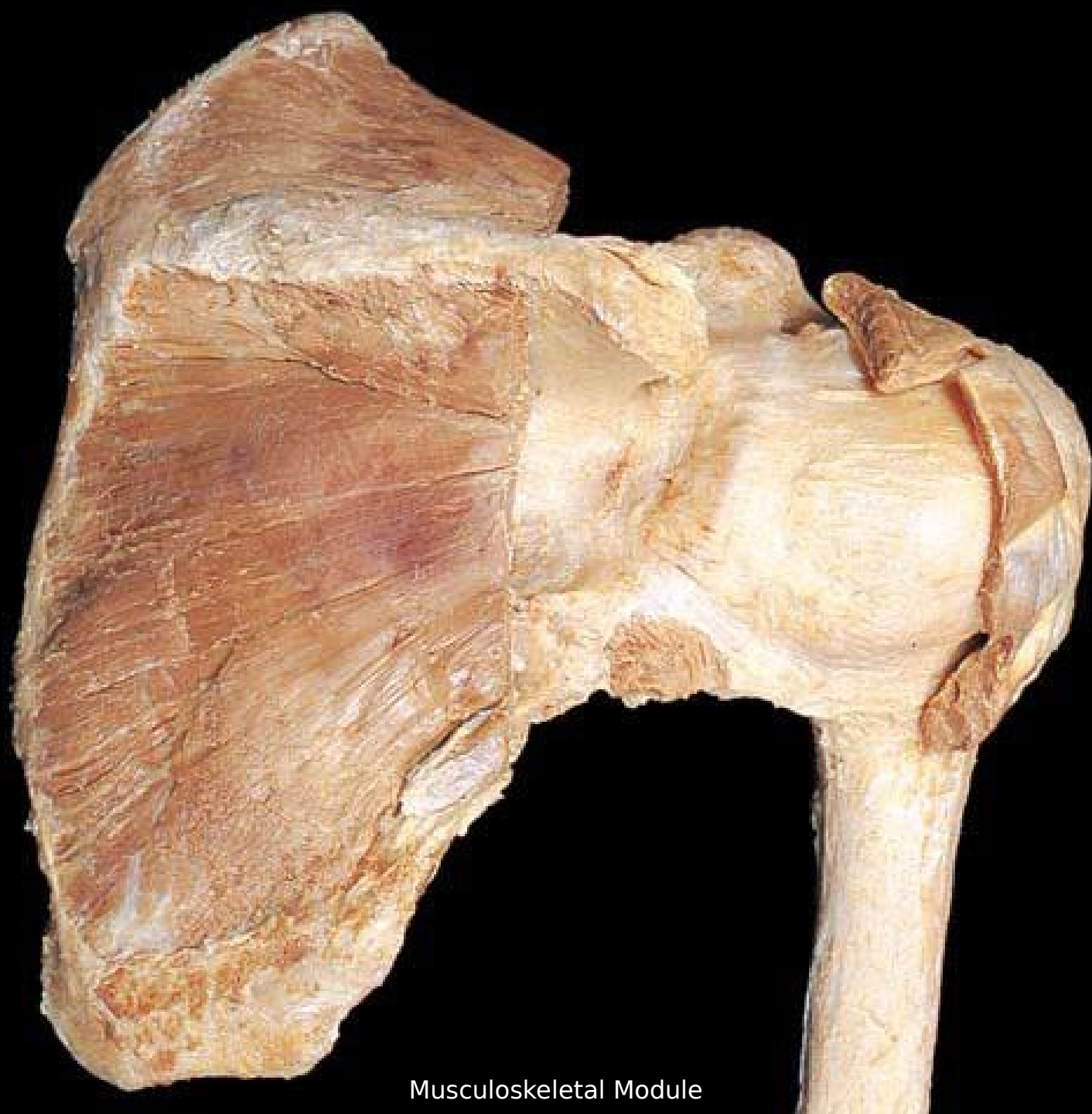
Clavicle (collar bone)

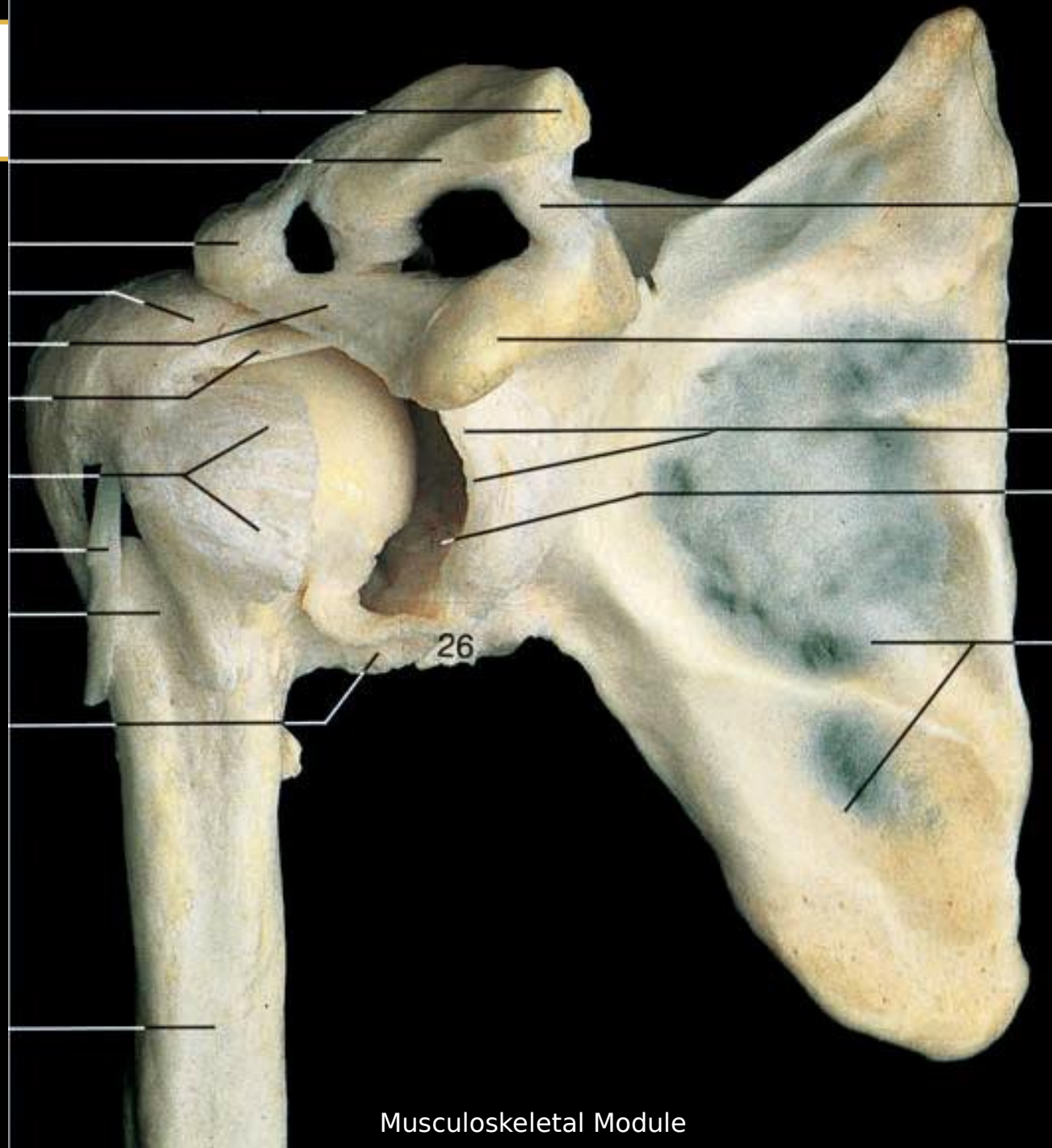
Bicep tendon

Humerus

Scapula (shoulder blade)

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# ***Movements of the Scapula***



## ***Elevation:***

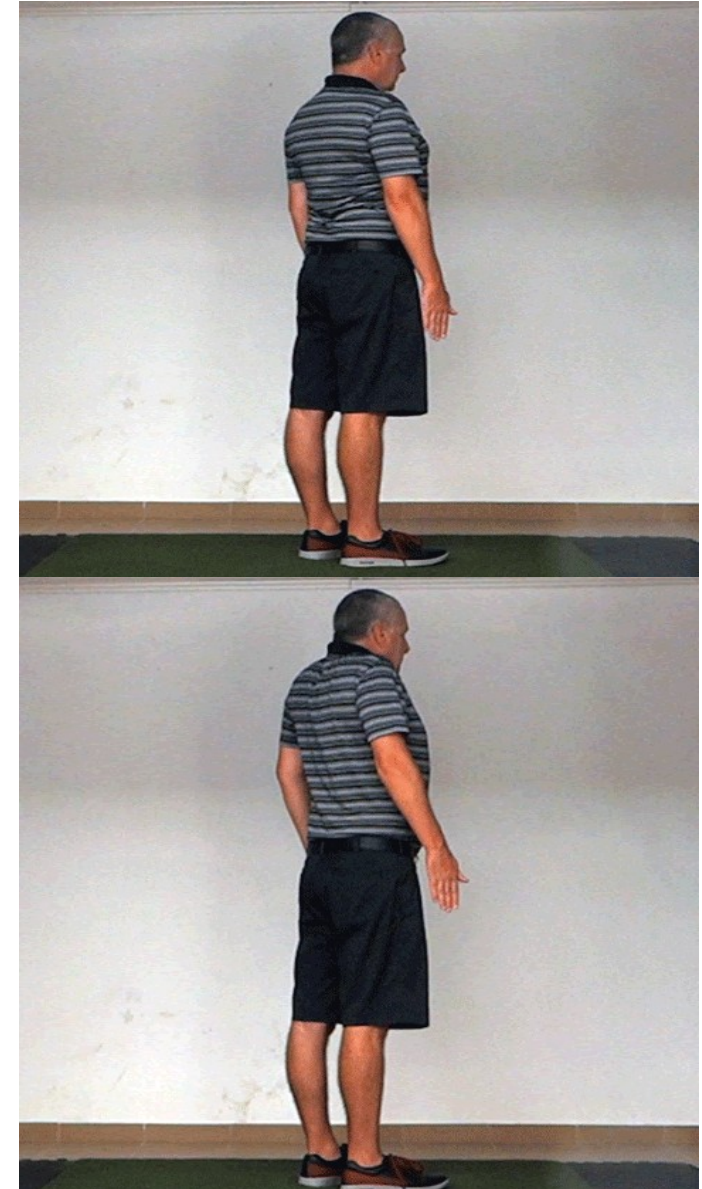
1. Upper fibers of trapezius.
2. Levator scapulae.

It is checked by: the costoclavicular ligament.

## ***Depression:***

3. Lower fibers of trapezius.
4. Pectoralis minor.
5. Gravity.

It is checked by: the interclavicular ligament & the articular disc of the sternoclavicular joint.





# ***Movements of the Scapula***



## ***3. Protraction (forward movement):***

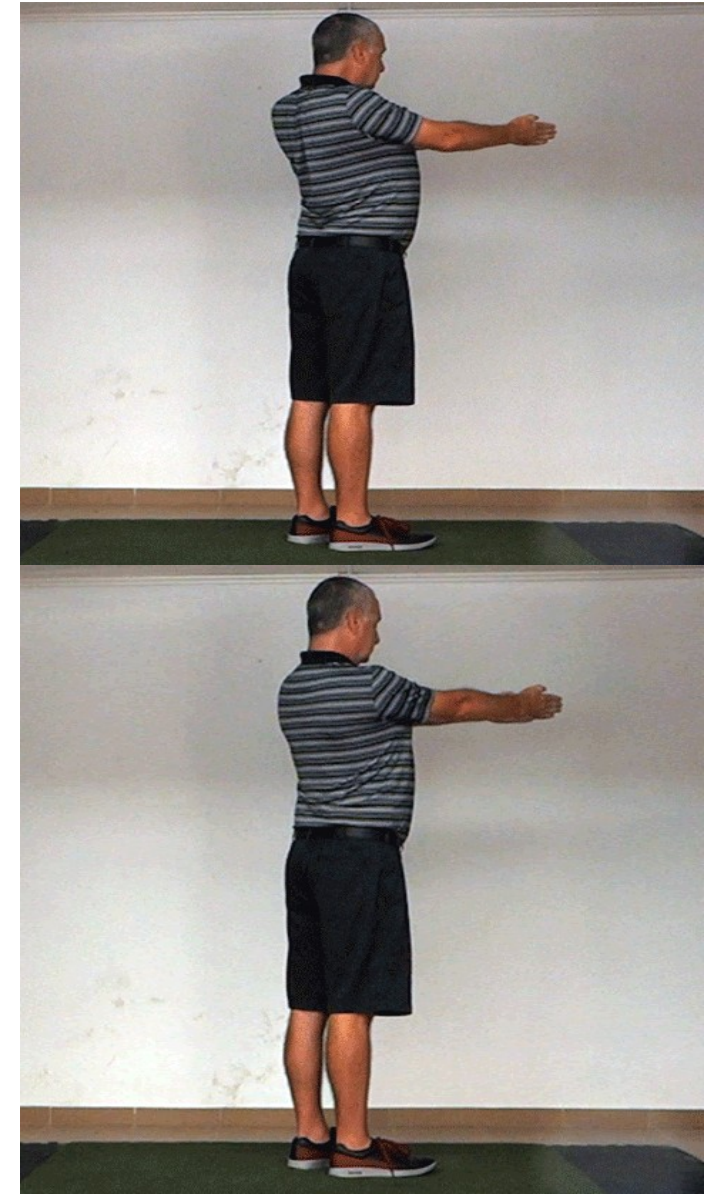
1. Serratus anterior.
2. Pectoralis minor.
3. Upper part of latissimus dorsi.

In protraction, the lateral end of the clavicle moves forwards while the medial end moves backwards.

## ***4. Retraction (backward movement):***

4. Middle fibers of trapezius.
5. Rhomboideus minor & major.
6. Gravity.

Throughout all movements of shoulder girdle, the subclavius serves to steady the clavicle.



# ***Movements of the Scapula***



## ***5. Lateral (upward) rotation:***

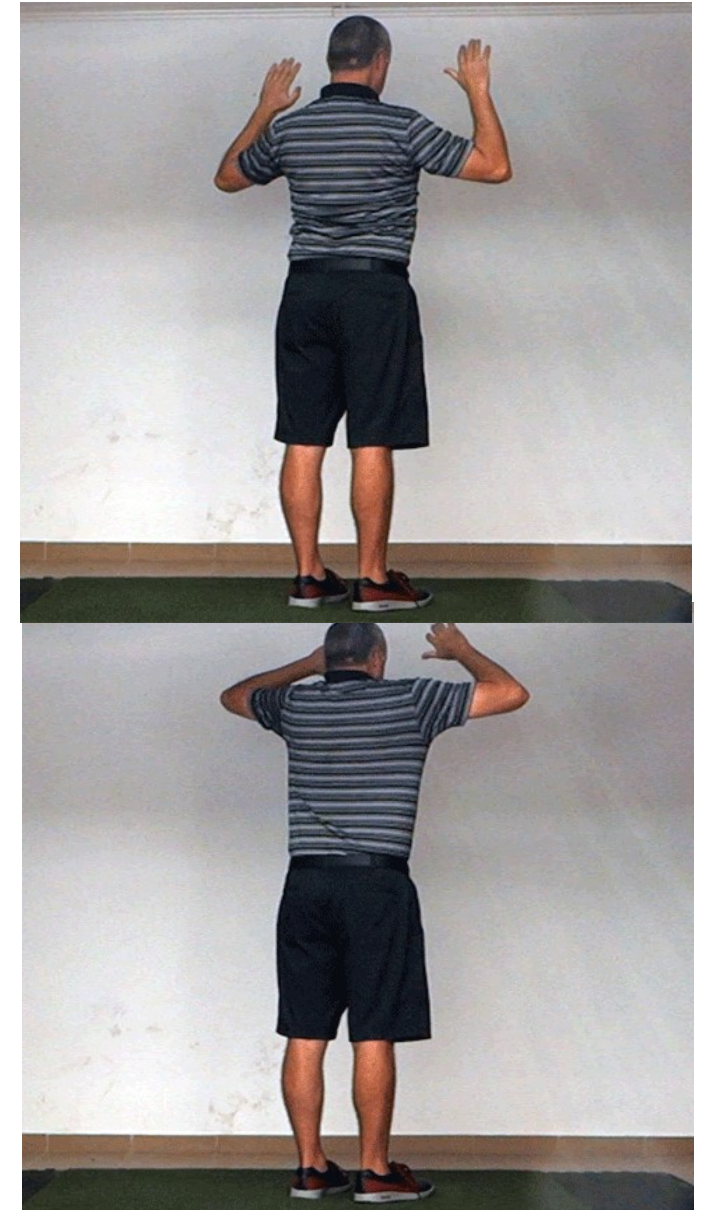
1. Upper & lower fibers of trapezius.
2. Lower 5 digitations of serratus anterior.

In lateral rotation, the glenoid cavity is directed upwards as in raising the arm above the head.

## ***6. Medial (downward) rotation:***

3. Levator scapulae.
4. Rhomboids (minor and major).
5. Gravity.

In medial rotation, the glenoid cavity is directed downwards.



# Shoulder Joint



- The **synovial membrane** lines the inner surface of the joint capsule and produces synovial fluid to reduce friction between the articular surfaces.
- It ***covers the glenoid labrum in addition to providing a tubular sheath for the long head of biceps brachii.***
- To ***reduce friction in the shoulder joint, several synovial bursae are present. A bursa is a synovial fluid filled sac, which acts as a cushion between tendons and other joint structures.***





New Five-Year Program



Musculoskeletal Module

# ***Capsule Perforations***

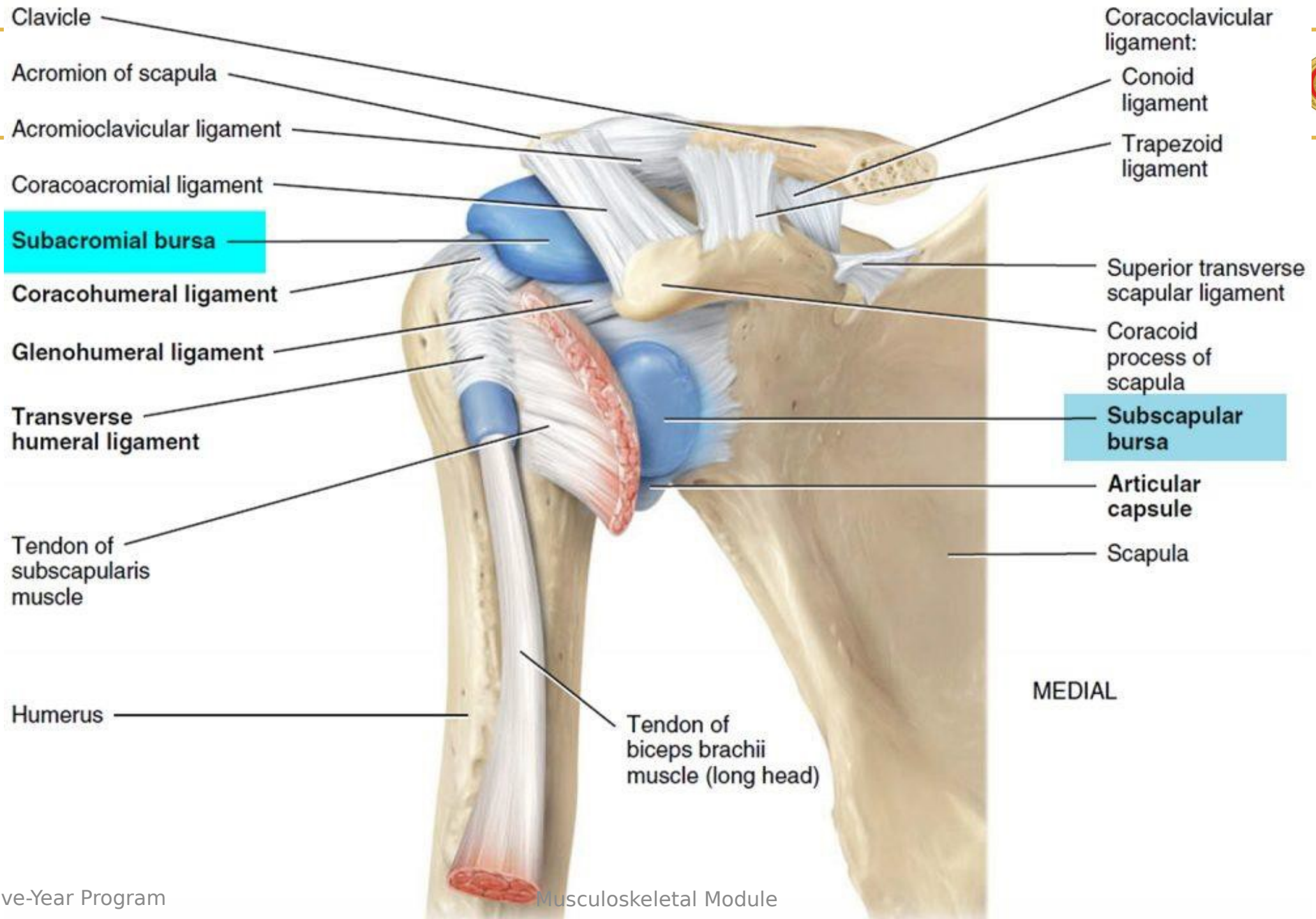


- 1. Anterior** perforation for communication with **subscapular bursa**.*
- 2. Posterior** perforation for **infraspinatus bursa** (may be absent).*
- 3. Lateral perforation** for exit of **tendon** of **long head** of **biceps** and its synovial sheath.*

# Shoulder Joint - Bursae



- **The bursae that are important clinically are:**
- **1. Subacromial:** located **deep** to the **deltoid and acromion**, and superficial to the supraspinatus tendon and joint capsule. The subacromial bursa reduces friction beneath the deltoid, promoting free motion of the rotator cuff tendons. **Subacromial bursitis** (i.e. inflammation of the bursa) can be a **cause** of shoulder **pain**.
- **2. Subscapular:** located **between** the **subscapularis tendon and** the **front** of the **capsule**. It reduces wear and tear on the tendon during movement at the shoulder joint. **Its continuous with the joint space.**
- **3. Infraspinatus bursa:** It lies **between** the tendon of **Infraspinatus** and the **back** of the **capsule** **(May be absent).**

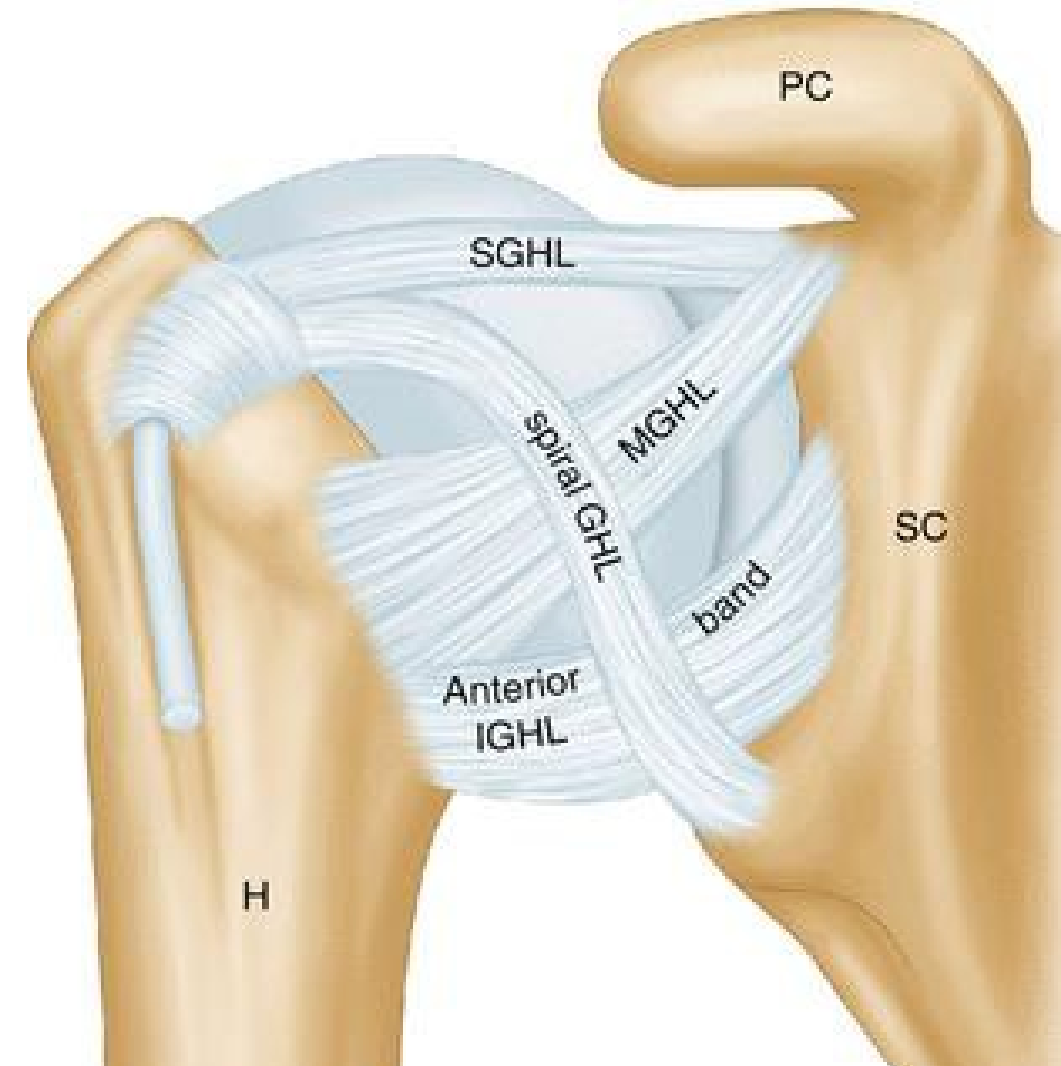




# Ligaments



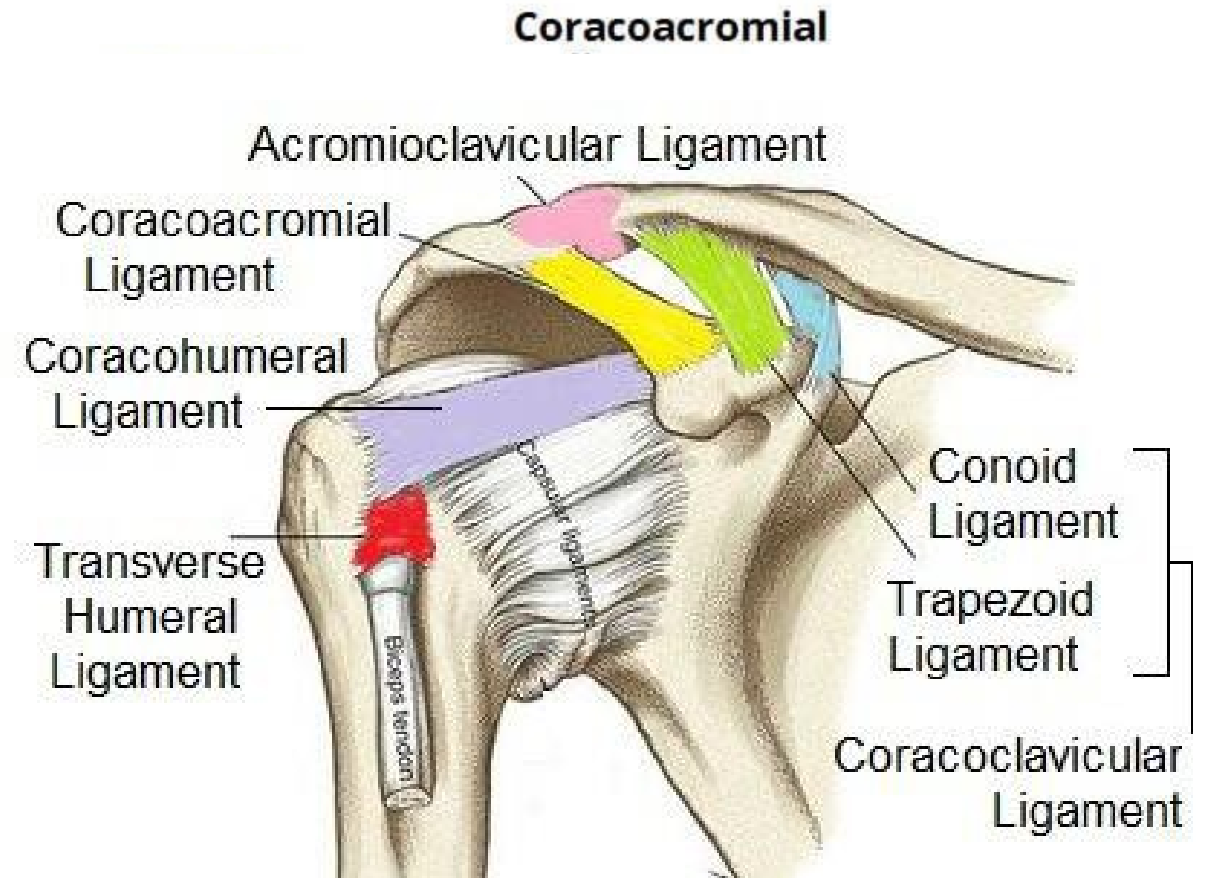
- *In the shoulder joint, the ligaments play a key role in stabilizing the bony structures.*
- **Glenohumeral ligaments** (**superior, middle and inferior**), the joint capsule is formed by this group of ligaments connecting the humerus to the glenoid fossa.
- *They are the main source of stability for the shoulder, holding it in place and **preventing it from dislocating anteriorly**.*
- **They act to stabilize the anterior aspect of the joint**



# Ligaments



- **Coracohumeral ligament:**
- attaches the base of the coracoid process to the greater tubercle of the humerus. It supports the superior part of the joint capsule.
- **Transverse humeral ligament:** spans the distance between the two tubercles of the humerus. It holds the tendon of the long head of the biceps in the intertubercular groove.





Coracohumeral Ligament

Transverse Humeral Ligament

Superior Glenohumeral Ligament

Middle Glenohumeral Ligament

Inferior Glenohumeral Ligament

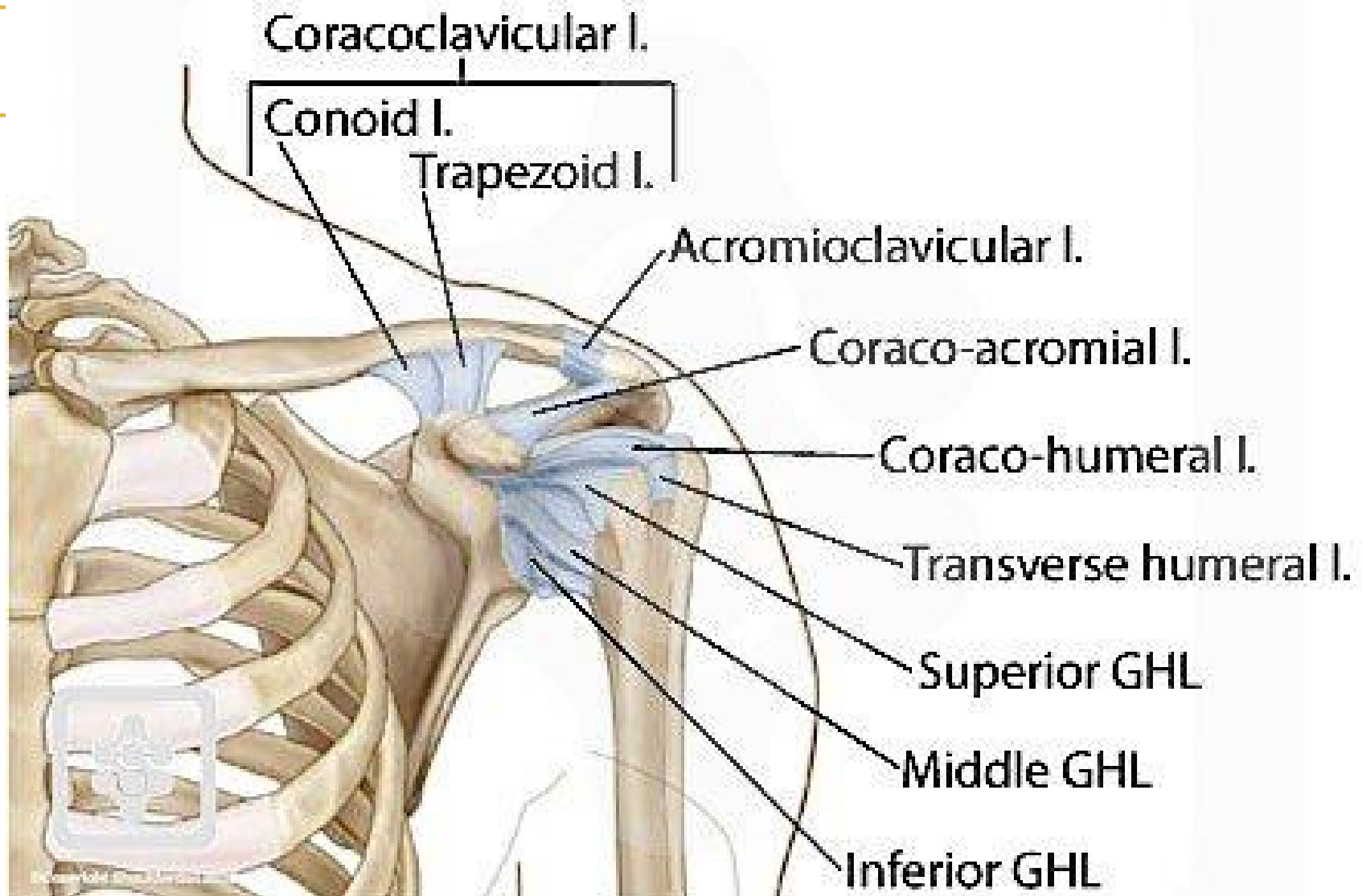
Folded Capsule Inferiorly

# Ligaments



- The other major ligament is the **coracoacromial ligament**. Running between the acromion and coracoid process of the scapula it forms the **coraco-acromial arch**.
- *This structure overlies the shoulder joint, preventing superior displacement of the humeral head upward*

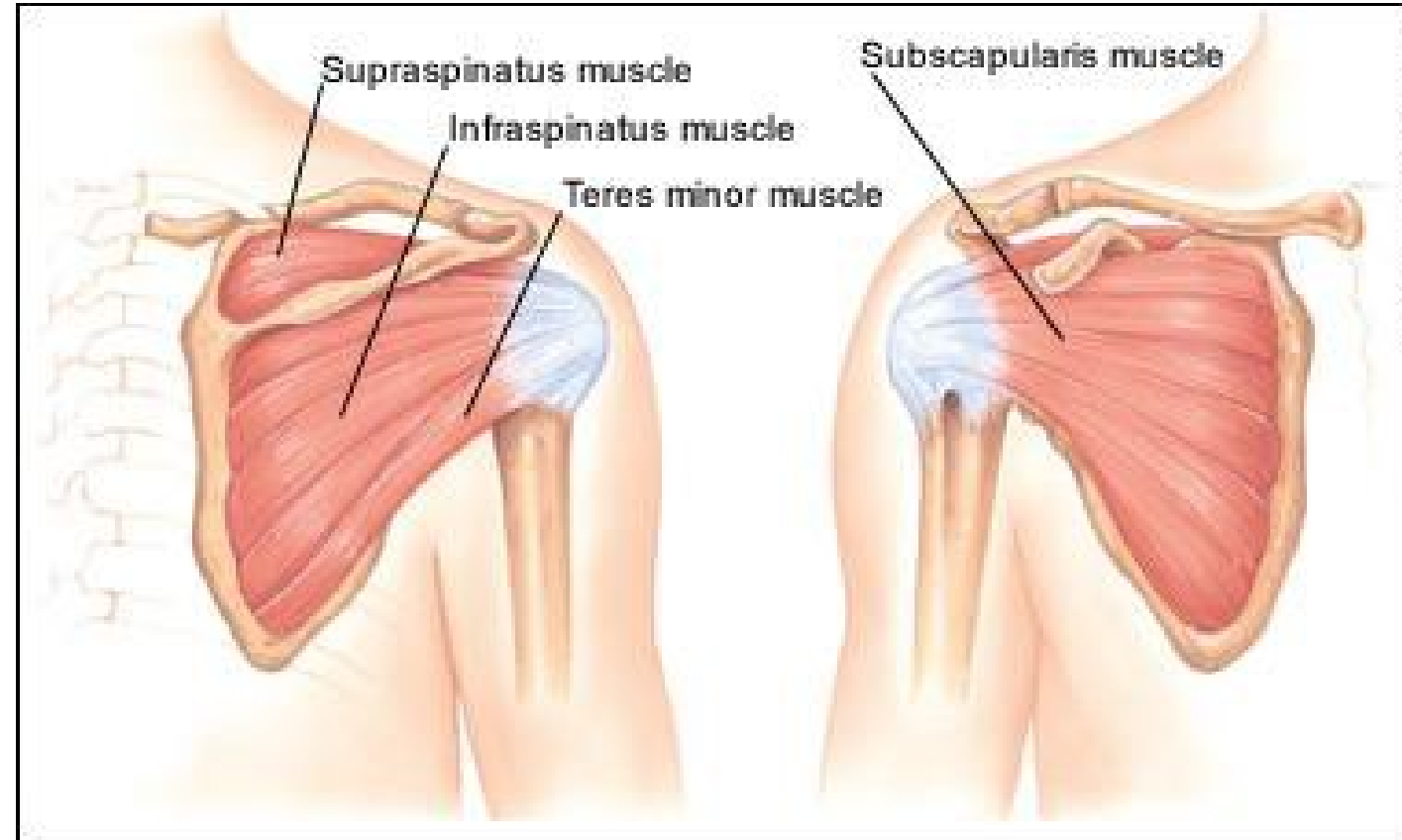




# ***Shoulder Joint - Relations***



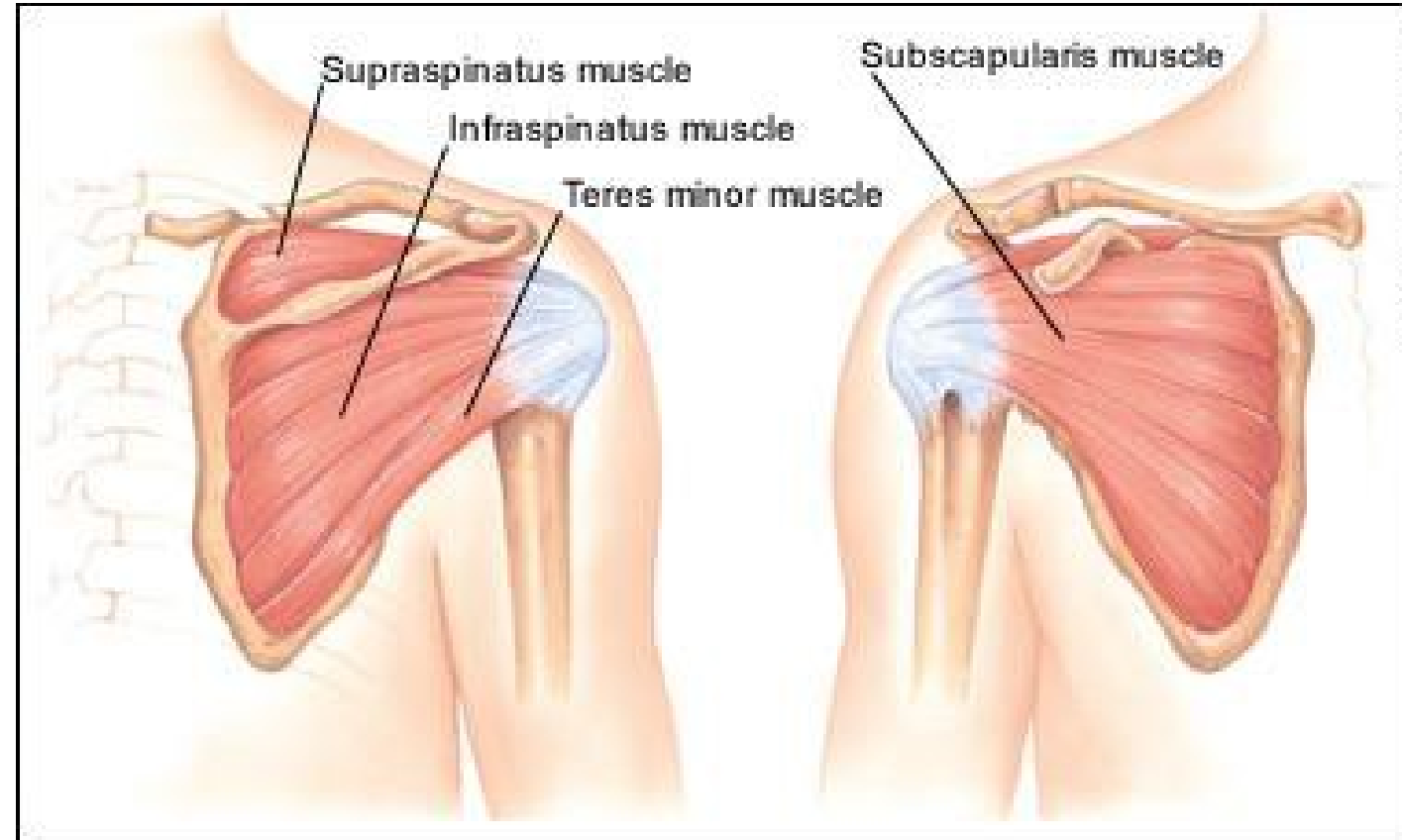
- ***Anteriorly:***  
Subscapularis
- ***Posteriorly:***  
infraspinatus and  
teres minor.



# Shoulder Joint - Relations



- **Superiorly:**
  - supraspinatus,
  - subacromial bursa,
  - coracoacromial ligament
  - and deltoid.
- **Inferiorly:** long head of
  - triceps, axillary nerve
  - and posterior circumflex
  - humeral vessels.



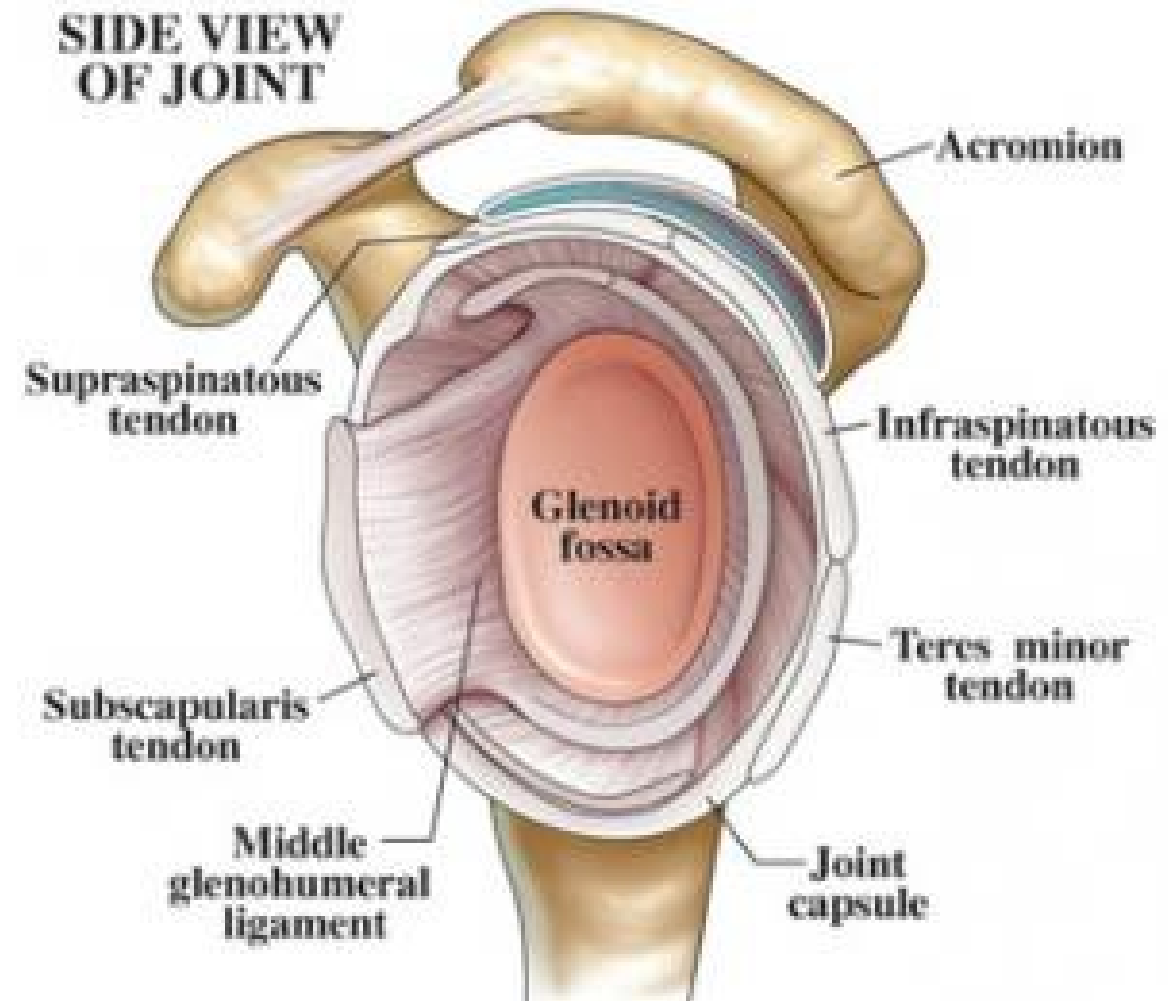
# Shoulder Joint - Stability

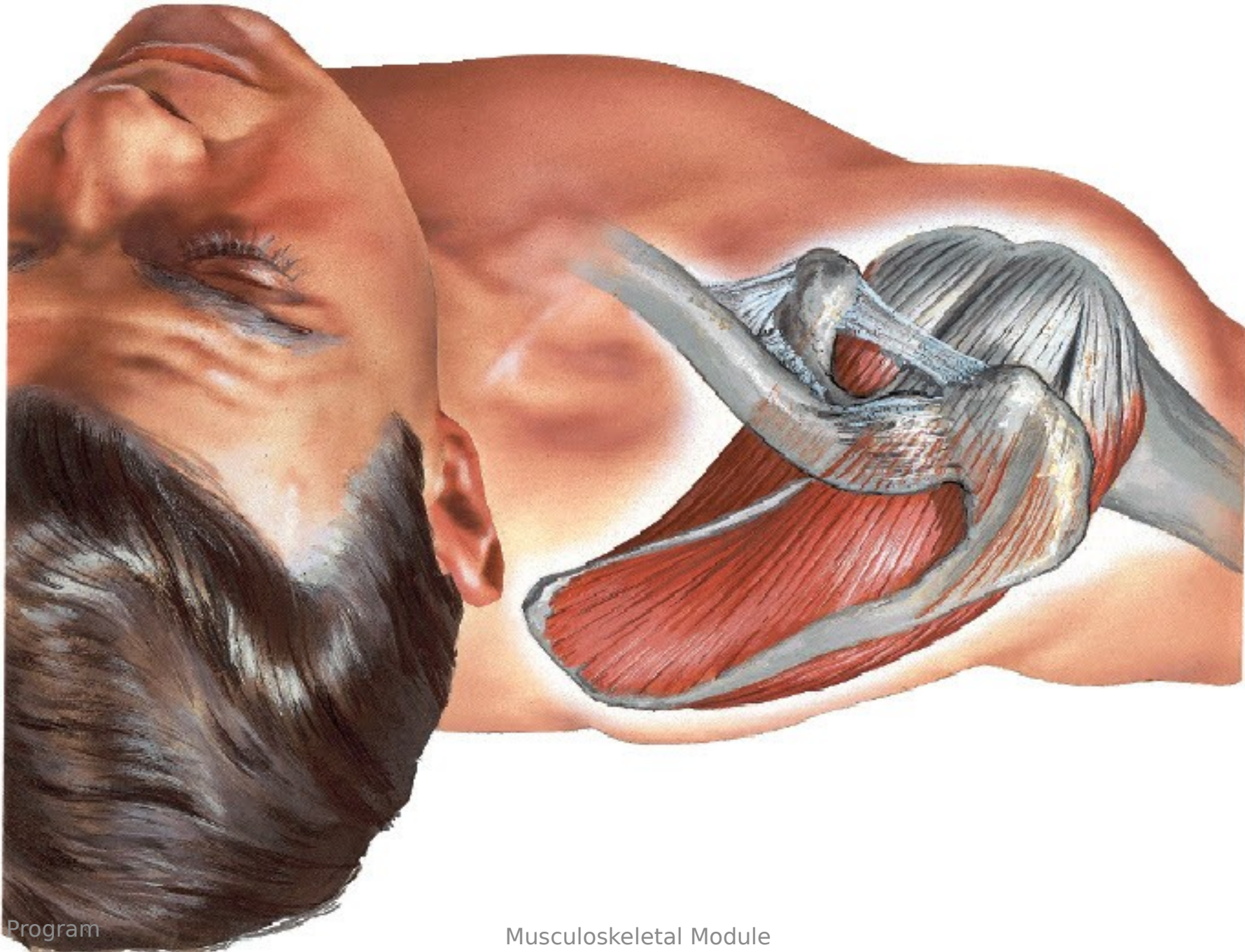


- **Tendons of rotator cuff:**

They blend with the capsule of the shoulder joint all around except interiorly, representing the main stabilizing factor of the joint because they retain the head of the humerus in the glenoid cavity.

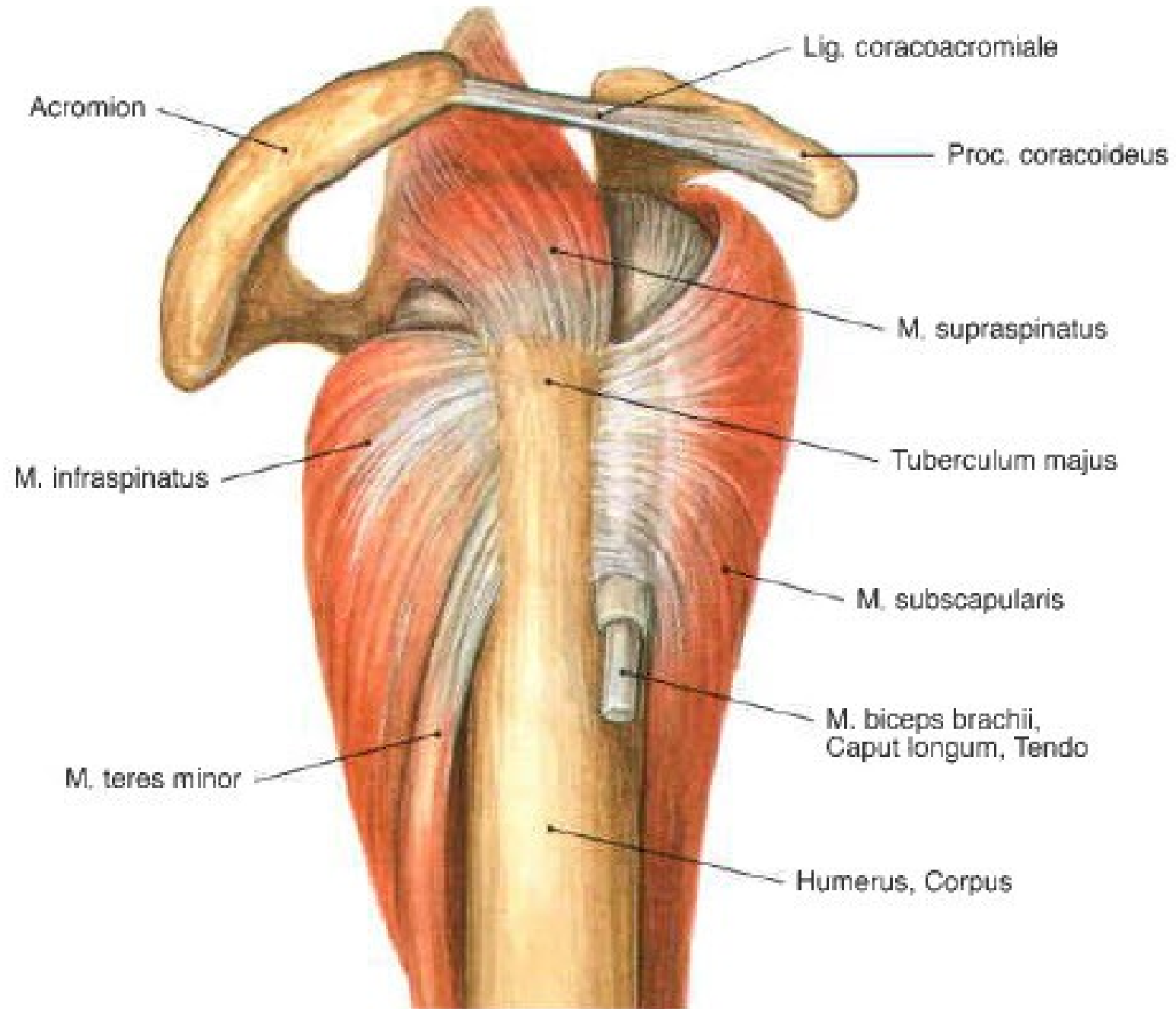
- **Coracoacromial arch:** It prevents the upward displacement of the humeral head.

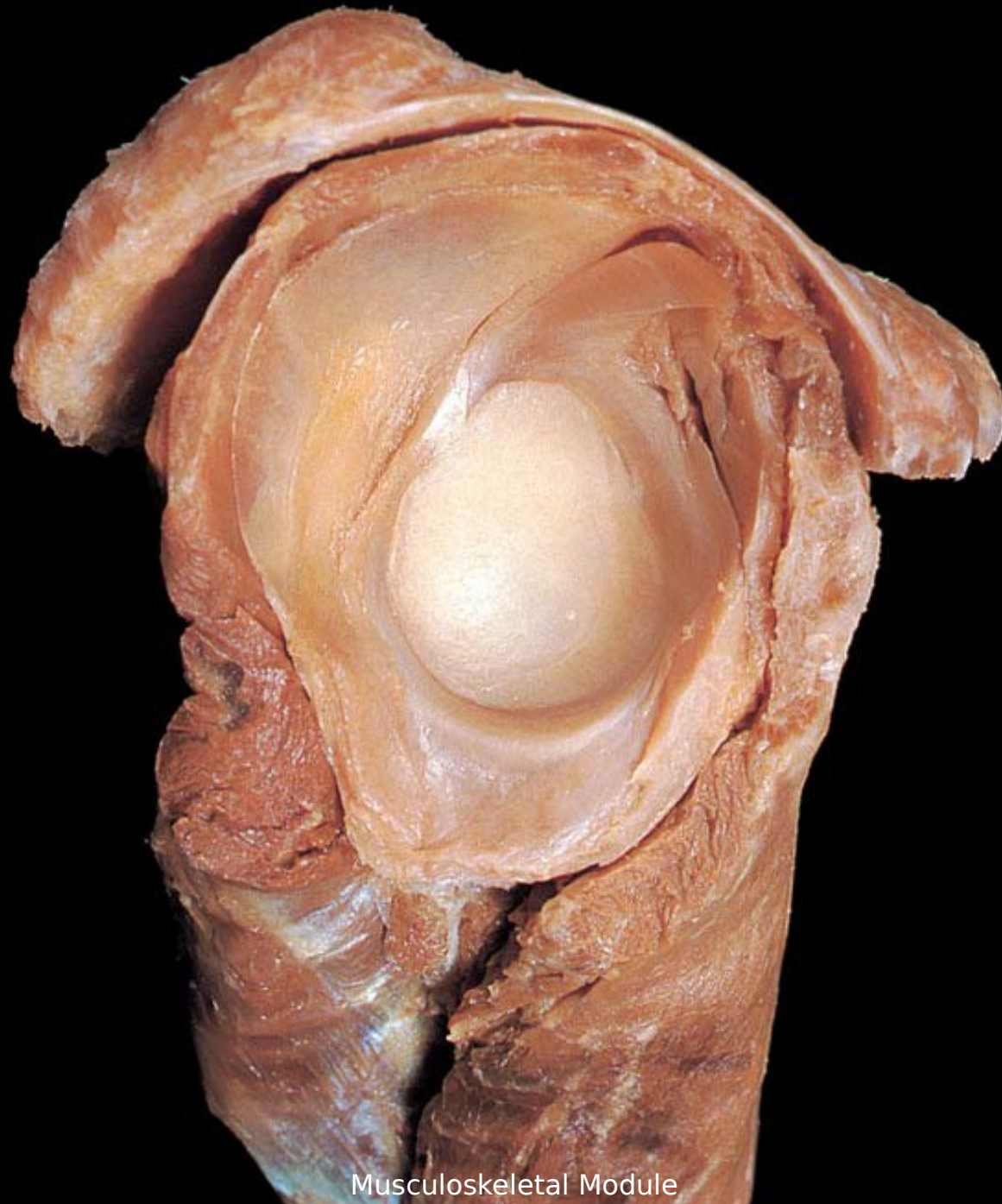










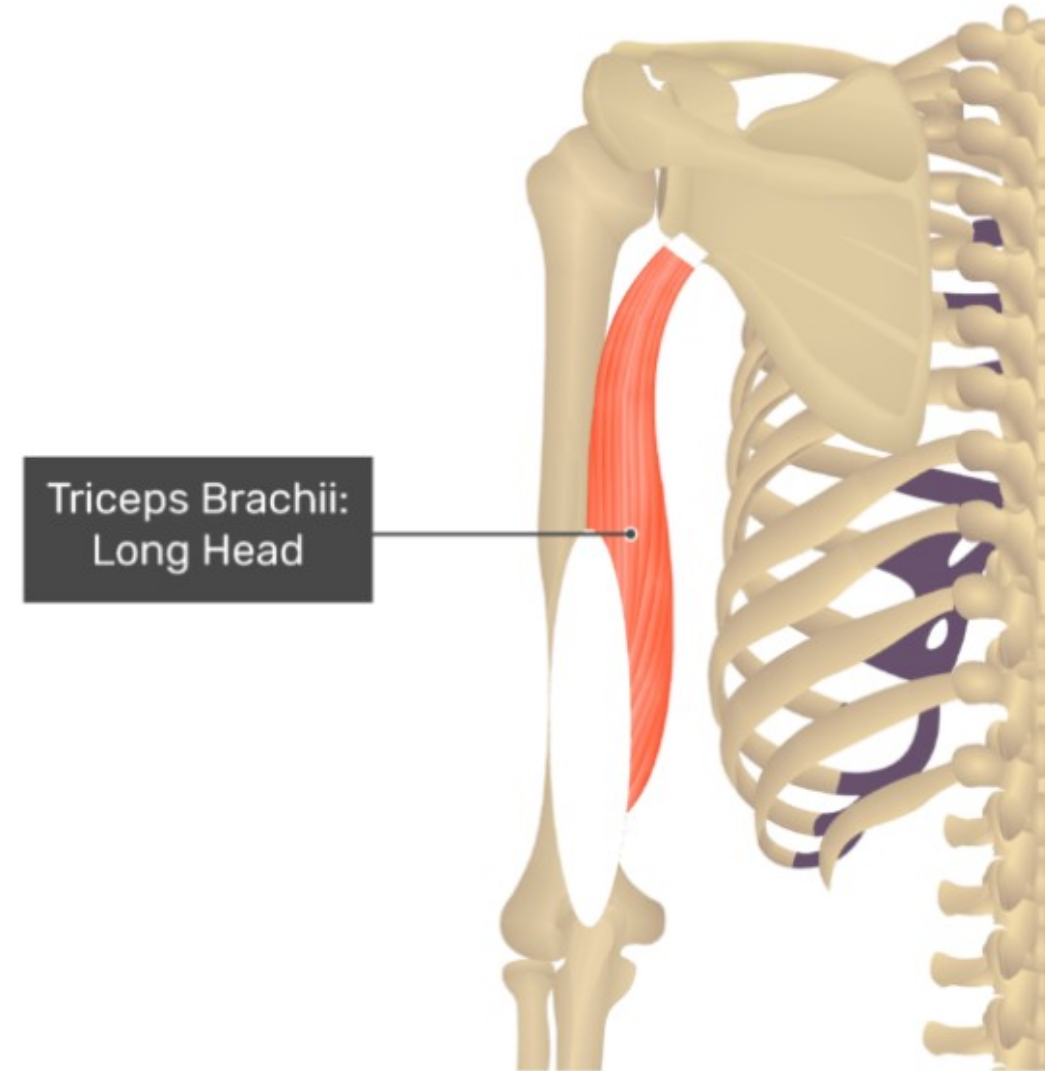




# ***Shoulder Joint - Stability***



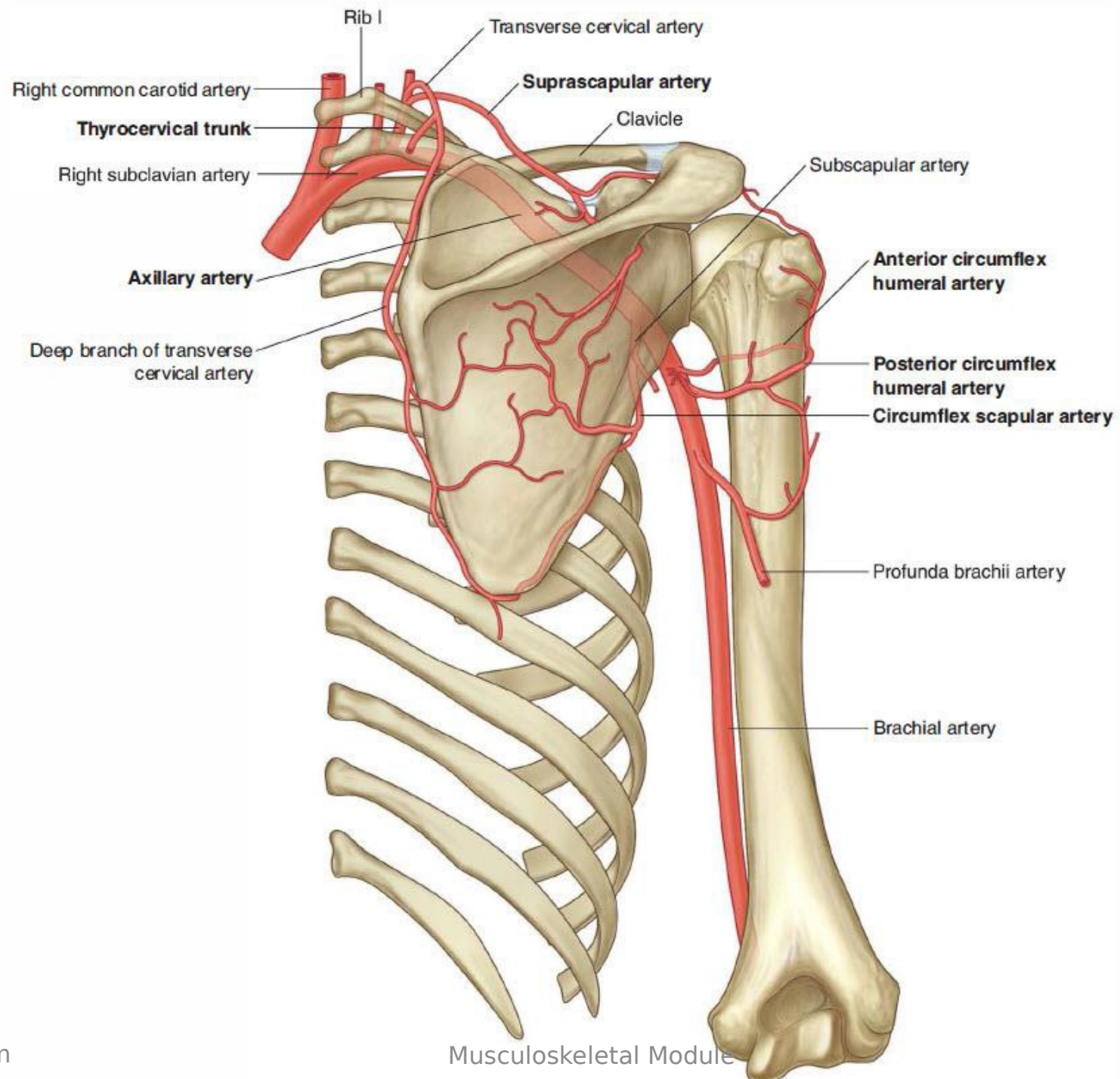
- ***Long head of triceps*** with the teres major support the abducted humerus from below.
- ***Labrum glenoidale:*** It is a fibrocartilaginous rim attached to the margin of the shallow glenoid cavity to deepen it.



# ***Blood and Nerve Supply***



- The shoulder joint is supplied by the ***anterior*** and ***posterior circumflex humeral*** arteries, which are **both branches** of the ***axillary artery***. Branches of the ***suprascapular artery***, a branch of the ***thyrocervical*** trunk.
- Innervation is provided by the ***axillary, suprascapular*** and ***lateral pectoral*** nerves.



## ***SUGGESTED TEXTBOOKS***

- Clinical Anatomy for Medical Students.  
Richard S. Snell
- Gray's anatomy for students .



• For further inquiries  
**PLZ** feel free to contact  
at any time through  
email

**gamaltaha@med.asu.edu**  
**.eg**





*Thank You*